A STUDY OF SPECTRUM OF GASTROINTESTINAL PERFORATIONS

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DECLARATION

I declare that the thesis entitled "**A STUDY OF SPECTRUM OF GASTROINTESTINAL PERFORATIONS**" has been prepared by me under the guidance of **DR. Varun Gupta**, Associate Professor, Department of General Surgery, Dayanand Medical College and Hospital, Ludhiana. No part of this thesis has formed the basis for the award of any degree previously.

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Dedicated

to

my Son

Guntaaz Singh

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"Sometimes there's not a better way. Sometimes there's only the hard way"

–Mary E. Pearson

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ABSTRACT

Introduction: Perforation peritonitis is the most common surgical emergency encountered by the surgeons all over the world. It is an emergency condition which requires an urgent surgical intervention, it is a significant cause of morbidity and mortality all over the world Gastrointestinal perforations accounts for major number of surgical emergencies at tertiary care centres

Aim of study: The aim of the present study was to study the etiology of gastrointestinal perforations and to assess the outcome of surgical intervention of gastro-intestinal perforations.

Material and Methods: This study was conducted as a descriptive study analysing 85 patients of secondary peritonitis from nov 2018 till oct 2019 at Dayanand Medical College and Hospital, Ludhiana. All cases found to have peritonitis as a result of perforation of any part of gastrointestinal tract at the time of surgery were included in the study.

Results: A total of 85 patients were studied, which included 55 males and 30 females. Most of patients aged between fifth to seventh decades of life. Most common site of perforation was small intestine with 44.7% cases in ileum, 12.9% in duodenum and 11.8% in jejunum and the commonest associated risk factor was typhoid (35.3%). Pain was the commonest presenting symptom. Most common complications were wound infection (9.4%) and fever (12.9%). Pneumoperitoneum was present in 80 cases (94.1%) in this study. Overall morbidity and mortality were acceptable. The basic principles of early diagnosis, prompt resuscitation and urgent surgical intervention still form the cornerstones of management in these cases.

Conclusion: From this study it is concluded that good resuscitation, early and energetic surgical Intervention, thorough peritoneal toileting with normal saline, blood transfusion, maintenance of fluid & electrolytes balance, improved anaesthesia, combination antibiotics, including metronidazole are the factors which reduce the morbidity and mortality of gastro intestinal perforations.

Keywords: Aetiology, Gastric Ulcer, Perforation, Peritonitis, Diverticulitis, Appendicitis.

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INTRODUCTION

Gastrointestinal perforation is one of the common surgical emergency encountered in surgeon's practice. Perforation of the stomach, duodenum and small bowel form a considerable proportion of emergency work load than colonic perforation. Causative factors and site of perforation vary enormously.

The gastrointestinal tract consists of the stomach, small intestine, and large bowel. It is possible for a perforation, or hole, to develop in the wall of the gastrointestinal tract. This condition is called gastrointestinal perforation.

Gastrointestinal (GI) tract perforations can occur due to various causes like appendicitis, diverticulitis, which is a digestive disease, peptic ulcer, inflammatory bowel disease, cancer in the gastrointestinal tract.

The condition may also be due to blunt trauma to the abdomen a knife or gunshot wound to the abdomen, abdominal surgery, stomach ulcers due to taking aspirin, nsaids, and steroids. Most of these perforations are emergency conditions, that require early recognition and timely surgical treatment.

Perforation is the most disastrous complication of peptic ulcer and inspite of modern management it is still life threatening catastrophe. The mainstay of treatment for bowel perforation is repair of perforation, surgically, Endoscopic, Laparoscopic and laparoscopic assisted procedures are now being increasingly performed instead of conventional laparotomy.

Gastrointestinal perforation is a painful condition that can lead to further health complications, so emergency surgery is often necessary.

Perforation of the small intestine is relatively common in developing countries where typhoid fever, tuberculosis and parasitic infestations are endemic' Appendicular perforation occur due to delay in seeking health care among poor section of the society.

Perforation of a duodenal ulcer allows egress of gastric and duodenal contents into the peritoneal cavity with a resulting initial chemical peritonitis. If continuing leakage of gastro duodenal contents, bacterial

contamination of the peritoneal cavity can occur. Peritonitis due to perforation of gastro intestinal hollow viscus is the common surgical emergency in India and the spectrum of disease is different from that found in the western world.

The advent of proton pump inhibitors and helicobacter pylori eradications in the management of chronic peptic ulcer disease has reduced the operative treatment of this condition to its complications. But yet perforated duodenal ulcer remains a major life threatening complication of chronic ulcer peptic disease. Despite advances in surgical techniques, antimicrobial therapy and intensive care support, management of peritonitis continues to be highly demanding, difficult and complex.

Perforation of the large intestine represent a major surgical challenge to the clinician, not simply because the technical aspects of the operation may be difficult but more importantly because the situation is rapidly lethal, in the type of compromising patients in whom the condition usually presents.

In developed societies most common cause are, the diverticular disease and colonic carcinoma, where as in the developing countries infective conditions such as amoebiasis is important. Perforation of the large intestine is a rapidly fatal condition, death being caused by sepsis from peritoneal contamination with various enteric pathogens both aerobic and anaerobic.

Majority of patients present with sudden onset of abdominal pain. A high index of suspicion is essential to diagnose visceral perforation early as significant morbidity and mortality results from diagnostic delay. Surgery plays an important role in management of perforations.

Evaluation and management of gastro-intestinal perforations provide some of the most challenging experiences for a surgeon with the advent of new technology. Surgeon must continually reassess standard method of treatment and be receptive to new ideas.

Perforation of the gastrointestinal tract may be suspected based upon the patient's clinical presentation, or the diagnosis becomes obvious through a report of extraluminal "free" gas or fluid or fluid collection on

diagnostic imaging performed to evaluate abdominal pain or another symptom. Clinical manifestations depend somewhat on the organ affected and the nature of the contents released (gas, succus entericus, stool), as well as the ability of the surrounding tissues to contain those contents.

The success of surgery to repair a perforation depends on the size of the perforation or hole and the length of time before treatment. The chances of recovery improve with early diagnosis and treatment.

Intestinal perforation can present acutely, or in an indolent manner (eg, abscess or intestinal fistula formation). A confirmatory diagnosis is made primarily using abdominal imaging studies, but on occasion, exploration of the abdomen (open or laparoscopic) may be needed to make a diagnosis. Specific treatment depends upon the nature of the disease process that caused the perforation. Some etiologies are amenable to a nonoperative approach, while others will require emergent surgery.

In most cases, surgery is necessary to close the hole and treat the condition. The aims of the surgery are to fix the anatomical problem, treat the cause of peritonitis, remove any foreign material in the abdominal cavity that might cause problems, such as feces, bile, and food.in rare cases patients are managed conservatively and perforation closes its own.

Sometimes, a piece of the intestine will need removal. The removal of a portion of either the small or large intestine may result in a ileostomy and colostomy which allows intestinal contents to drain or empty into a bag attached to your abdominal wall.

Gastrointestinal perforations accounts for major number of surgical emergencies at tertiary care centres.at the outset of this prospective study spectrum of GI perforations will be studied for its etiological patterns. The role of early surgical interventions along with observed mortality and morbidity.

If a person has any of the illnesses that may lead to gastrointestinal perforation, they should follow the treatment plan that their doctor advises. This reduces the risk of developing the condition. As with any

condition, the outlook improves with early diagnosis and treatment. The size of the hole and the length of time before treatment may determine how successfully surgeons can repair the perforation. This will, in turn, affect the recovery.

AIMS AND OBJECTIVES

1) To study the etiology of gastrointestinal perforations
2) To assess the outcome of surgical intervention of gastro-intestinal perforations.

REVIEW OF LITERATURE

Jhobta RS et al 2006, Perforation peritonitis is the most common surgical emergency in India. The spectrum of etiology of perforation in Tropical countries continues to be different from its Western counterpart. The objective of the study was to highlight the spectrum of perforation peritonitis as encountered by us at Government Medical College and Hospital (GMCH), Chandigarh.[1]

Hecker A et al 2015: Despite its relevance literature on the time dependency of early surgical intervention in intestinal perforation is rare and contradictory. In this pilot study there is a tendency that immediate surgical intervention might be of advantage for septic emergency patients.[2]

Sahil single et al,2019 The most common etiology of perforation peritonitis was peptic ulcer disease (41%) followed by enteric fever (15%) and tuberculosis (13%)The most common site of perforation in this series was gastroduodenal (43%) followed by terminal ileum (30%). Mortality rate was 5% and significantly high in patients coming to the hospital after 24 hours.

T kemparaj et al 2017: Gastrointestinal perforations are one of the most common surgical emergencies. Duodenal perforations are most common. Ileal perforations secondary to enteric fever (typhoid) have highest morbidity and mortality. Most of the anastomotic leaks can be treated conservatively. Mortality depends on the general condition of the patient and associated pre-operative comorbidities.[4]

Dinesh yadav et al,2013, The most common cause of perforation peritonitis noticed in our series was perforated duodenal ulcer (26.4 %) and ileal typhoid perforation (26.4 %), each followed by small bowel tuberculosis (10.3 %) and stomach perforation (9.2 %), perforation due to acute appendicitis (5 %). The highest number of perforations was seen in ileum (39.1 %), duodenum (26.4 %), stomach (11.5 %), appendix (3.5 %), jejunum (4.6 %), and colon (3.5 %). Overall mortality was 13 %. The spectrum of perforation peritonitis in India continuously differs from western countries. The highest number of perforations was

noticed in the upper part of the gastrointestinal tract as compared to the western countries where the perforations seen mostly in the distal part. The most common cause of perforation peritonitis was perforated duodenal ulcer and small bowel typhoid perforation followed by typhoid perforation.[5]

Rajandeep Singh Bali et al 2014,The commonest cause of perforation peritonitis included 179 cases of peptic ulcer disease (150 duodenal ulcers and 29 gastric ulcers) followed by appendicitis (74 cases), typhoid fever (48 cases), tuberculosis (40 cases), and trauma (31 case). The overall mortality was 7%.[6]

Beniwal Udai Singh et al 2003, the present study was conducted in 200 patients of typhoid perforation treated surgically. The aim of the study was to compare the results of different operative procedures done in enteric perforation in terms of morbidity, mortality, and cost effectiveness and to find out the ideal operative procedure. The overall morbidity and mortality were 51% and 10.5% respectively. Common postoperative complications included wound infection (23%), bleeding (5.5%), fecal fistula (16.5%) and skin excoriation around ileostomy (5.7%). The number of perforations and the development of fecal fistula were factors which significantly affected mortality (P value <. 025 and <. 001 respectively). In conclusion, repair of the perforation is a better procedure than temporary ileostomy in enteric perforation due to its cost effectiveness and absence of complications related to ileostomy. Ileostomy and ileo-transverse bypass should be considered as treatment options in patients with an unhealthy gut.[7]

Adesunkanmi AR, Ajao OG et al 1997, to determine the prognostic factors in typhoid ileal perforation, a prospective study was carried out in 50 patients with typhoid ileal perforation confirmed at operation. Attention was paid to pre-operative and post-operative factors. The sex ratio was 4:1 in favour of male, with an age range of 7-42 years and a mean of 19.5 years. The age and sex had no effect on the prognosis. Fourteen patients (28%) died, 50% of these within the first 5 post-operative days. Seventy-one per cent of the 14 died within 10 days. Thus, surviving for more than 10 post-operative days tends to give a

better chance of recovery. In conclusion, this study has attempted to outline those factors with a strong effect on the progression and outcome of typhoid ileal perforation in Nigerian patients. [8]

Plummer JM et al 2004, to determine the management of perforated duodenal ulcer at the University Hospital of the West Indies (UHWI) in this era of Helicobacter pylori. The records were analyzed for the following: age, gender, duration of symptoms, non-steroidal anti-inflammatory drug (NSAID) use, smoking status, operative repair duration of hospitalization, Helicobacter pylori status and medical therapy, peri-operative complications, mortality and recurrence. In this study population, perforated duodenal ulcer occured overwhelmingly in males less than 50 years of age. There is a trend towards exclusive simple surgical closure and H pylori eradication at the UHWI for patients with perforated duodenal ulcer but this needs to be supported by documentation of H pylori prevalence in the population of patients presenting with perforated peptic ulcers. [9]

Ersumo T et al 2005, Little is known on the pattern of perforated peptic ulcer in Ethiopia. To evaluate the early, outcome of management, a five-year retrospective analysis of 74 operated cases of perforated peptic ulcer was undertaken. Perforated peptic ulcer accounted for 3.4% of the adult emergency surgical procedures. The mean age was 32.6 years, with a male to female ratio of 7.2 to 1.0. Fifty-six percent of the cases were unmarried. In nearly 22.0% of the patients, no previous history of peptic ulcer disease was documented. Delay in diagnosis was noted in 95% of the cases. Most patients had duodenal ulcer perforation, and about 78% had purulent peritonitis at laparotomy. Fourteen died in hospital. Early presentation of patients to surgical care facilities may reduce morbidity and mortality in cases of peptic ulcer perforation.[10]

Grassi R et al 2005, Twenty patients underwent immediate surgery with no preoperative imaging evaluation, in 10 of them the site of perforation was found in a juxta-pyloric region and in the others at level of duodenum. In 146 patients submitted to serial radiological investigations before surgery, the site of perforation was in 56 (38.3%)

duodenal, in 52 (35.6%) juxta-pyloric, in 28 (19.1%) gastric and in 10 (6.8%) pyloric. The cause of perforation was in all cases gastric or duodenal ulceration, in seven cases involving pancreatic parenchyma. In 110 (75.4%) patients with direct findings of perforation, in 94 cases (85.5%) the correct diagnosis was established on abdominal plain film, in two (1.8%) with radiographic and sonographic examinations and in 14 (12.7%) on CT findings. In 36 (24.6%) patients with no direct findings of perforation, only 24 (16.4%) of them showed indirect findings of perforation. In other 12 patients no direct or indirect finding of free peritoneal air was detected. [11]

William N et al 1997, although subdiaphragmatic gas on an erect chest or abdominal radiograph usually indicates the presence of a gastrointestinal perforation, this sign is present in only 60-80% of cases. Other less well known radiographic signs of perforation that may nonetheless be of utmost importance in diagnosis are described. The presence of such signs may then prompt further diagnostic procedures or surgical intervention as appropriate. [12]

Parulekar, S.G et al 1972, the incidence and radiologic characteristics of acquired terminal ileal diverticulosis are discussed. Diverticula of the terminal ileum are often demonstrated on routine small bowel examination; however, the incidence reported in the literature is much lower (0.5%) than the 1.9% seen in this series. The ratio of ileal to jejunal diverticula was 2.9 to 1 as compared to the reported figures of 1 to 5. The only reported complication of terminal ileal diverticula is diverticulitis. Radiographic findings of diverticulitis may include thickening of mucosal folds, pressure defects from an inflammatory mass, or perforation with or without demonstration of diverticula. Four representative cases are presented.[13]

Rodr1guez-Sanjuan JC et al 2005, Simple closure followed by Helicobacter pylori (Hp) eradication has become the most used procedure in perforated ulcer treatment. However, its efficacy and safety are still to be determined. Ninety-two consecutive patients (ages: 19-96 years) were operated on between 1996 and 2002, and treated by simple closure followed by Hp eradication and NSAID

avoidance. The data were prospectively collected in a database. Hp infection was diagnosed in 68 patients (73.9%). Thirty-four patients (37%) consumed nonsteroidal anti-inflammatory drugs (NSAIDs), and 23 (25%) had both Hp infection and NSAID antecedents. The perforation was gastric in 4 cases and pre-pyloric, pyloric or duodenal in 88. There were postoperative complications in 24 patients (26%) and 4 patients died (4.3%). Hp eradication was shown in 46 patients. There was clinical ulcer recurrence in 4 (4.3%); in 3 of them recurrence manifested as re-perforation, all in gastric locations. [14]

Mewara BC et al 2017, the maximum number of patients in our study was in age group of 31- 40 years (23%) with a mean age was 40.29, years. There were 89 males (89%) as compared to 11 females (11%). The most common site of perforation in our series was gastroduodenal (81%) followed by small bowel perforation (13%), appendicular perforations (4%), colonic perforation (1%) and rectal perforation (1%). The rate of complication was 21%. Mortality rate was 7% and significantly high (100%) in patients coming to the hospital after 24 hours.[15]

Hosoglu S et al 2004, A case-control study was performed using the records of patients hospitalized for typhoid fever at Dicle University Hospital, Diyarbakir, Turkey, between 1994 and 1998. Case patients with enteric perforation were compared with control patients with typhoid fever but no enteric perforation. Risk factors for perforation were determined using logistic regression modeling. Forty case patients who had surgery because of typhoid enteric perforation were compared with 80 control patients. A short duration of symptoms, inadequate antimicrobial therapy, male sex, and leukopenia are independent risk factors for enteric perforation in patients with typhoid fever.[16]

Nahar S et al 2017, Duodenal perforation was the commonest cause of small bowel perforation, contributing to 51 (56.66%) patients. Peptic ulcer disease accounted for 49 (96.07%) patients and blunt trauma abdomen for 2 (3.9%) of these patients. Jejunal perforations accounted for 9 (10%) patients and ileal perforations for 30 (33.34%) patients.

Typhoid fever was the commonest cause of ileal perforation in 24 (80%) patients Blunt trauma abdomen was the commonest cause in 5 (55.55%) patients of jejunal perforations. [17]

Shin R et al 2016, the mean age of enrolled patients was 66.0 ± 15.8 years and 66% of the patients were male. Fifteen patients (13%) died within 1 month after surgical treatment. Univariate analysis indicated that patient-related factors associated with mortality were low systolic and diastolic blood pressure, low serum albumin, low serum protein, low total cholesterol, and high blood urea nitrogen; the surgery-related factor associated with mortality was feculent ascites. Multivariate analysis using a logistic regression indicated that low systolic blood pressure and feculent ascites independently increased the risk for mortality; postoperative complications were more likely in both females and those with low estimated glomerular filtration rates and elevated serum C-reactive protein levels.[18]

Vinod kumar et al, 2014 among the 31cases of gastrointestinal perforation, perforation of duodenal ulcer 9 cases (29.3%) was the commonest, there was male predominance constituting 21(67.7%), peptic ulcer perforation maximum is seen between June and September. The most common complication recorded was wound infection 5 cases (16.1%), death 4 cases (12.9%.Median length of the stay was 13days (2-44days).[19]

Malhotra M et al 2016, The most common cause of perforation peritonititis noticed in our series was peptic ulcer perforation 43 cases (46%), followed by ileal perforation 30 cases (32%), appendicular perforation 6 cases (6.4%), gallbladder perforation 5 cases (5.3%) and all the jejunal perforation 6cases (6.4%) was post traumatic. Large bowel and malignant perforation were least common in our series. Highest no. of perforation noticed in upper part of Gastro intestinal tract as compared to western countries where perforations are seen in distal parts. Mortality was of 11 cases (11.8%) & morbidity was noticed in 55 cases (59%).[20]

Dhanapal Pattanam Velappan et al, 2017, The results obtained in the present study were analysed: Among hollow viscus perforation duodenal ulcer perforation was common (52 out of 100 cases). Next being appendicular perforation. Age group of 20-40 years were affected mainly. Males are affected more than females. Signs and symptoms of acute abdomen like acute abdominal pain vomiting fever may present tachycardia, hypotension, abdominal tenderness guarding\rigidity with obliteration of liver dullness and absence of bowel sounds and absolute constipation were predominant signs.[21]

A Bhaskar et al, 2020, In this series maximum number of cases was seen between the age group of 15-50 years with male patients accounting for 80% of cases. Mean age of patients was 36 years. Pain abdomen (100%), vomiting (56%) and fever (50%) were most common presenting symptoms in all cases of peritonitis. Tenderness and rigidity were present in all the cases. In this series duodenal perforation was the most common cause of acute peritonitis followed by appendicular perforation (16%), ileal (8%), intestinal gangrene (8%), Jejunal perforation (6%), gastric perforation (4%) and colonic perforation (2%). All the patients were taken for surgery. Wound infection was must commonest complication (10%) seen in the post-operative period. This was followed by fecal fistula (6%) and pelvic abscess (4%). In general complications septicemia (12%) was the most common. Mortality rate was (12%) in this study with septicemia and multi organ failure being the commonest cause of mortality. Mean age of patients who expired was 51 years. Mortality was clearly more in patients who presented more than 24 hours duration after the onset of symptoms.[22]

Parwez Sajad Khan et al 2013, Thirty-six patients in the study developed complications and 17 died. Statistics showed that 8 factors influenced morbidity and 11 influenced mortality. This study aims to identify factors in patients with peritonitis which have a significant bearing on morbidity and mortality. These factors could be later used to predict the outcome in patients with generalized peritonitis.[23]

Dr. Ramesh Kumar Korumilli et al 2018, In our study, out of 171 patients, 133 were males (77.78%). 20 to 40 years of age group are most susceptible for perforation (47.37%). Gastro-duodenal perforation (48.54%) followed by appendicular (33.92%) perforation is the most common. Pain abdomen is universal symptom and tenderness is universal sign in our study (100%). Chronic alcoholism and peptic ulcer disease is most commonly associated with gastric and duodenal perforation. Delayed presentation >48 hours associated with co-morbidities are leading causes of septicemia and death.[24]

G. Kishore Babu et al 2016, Typhoid fever and traumatic aetiology are the most common cause of Ileal perforation, followed by TB. Patients are more of male gender and are in reproductive age group. Widal serology is a useful test in the diagnosis of typhoid fever; histopathology is useful in the diagnosis of tubercular perforations. Ileal perforations have a higher morbidity rate. Traumatic perforations have a good outcome than other causes. [25]

V. Sitaram et al 1990, this report examines the characteristics of 124 patients with typhoid ileal perforation treated over a 17-year period ending in 1986. Three adverse prognostic determinants were identified: prolonged fever/perforation interval, prolonged perforation/operation interval and multiple perforations. Simple closure was performed in 74 patients with a mortality of 31.1%, and trimming of the ulcer with closure in 38 patients with a 7.9% mortality. [26]

Archana A. Nema et al 2018, Mean duration of the stay for patient undergone PC+PL was 10.20 days and for ileostomy it was 18.4 days and for RA + PL it was 18.6 days. Total 37 incidence of complications were found in 45 cases. Among them wound infection was presented in 16 (43%) and burst abdomen presented in 2 (5%) cases. Fecal fistulae, post-operative collection and pneumonitis were present in 4 (11%) cases each. [27]

Sandeep Jain et al 2018, Out of 105 patients, majorities were less than 30 years and were males (4:1). Most common presentation being pain abdomen (100%), followed by fever (85.71%) while signs of peritonitis are present in all patients (100%) and majority patients had septicemia

(77.14%) (TLC count >11,000 or <4,000) on presentation. 82 (78.09%) patients were Widal positive. Among CAT I (n=47), majority require primary repair (n=27; 57.44%) followed by resection anastomosis (n=14; 29.78%) and ileostomy (n=5; 10.63%) while among CAT II (n=38), majority require ileostomy (n=12; 31.57%) followed by resection anastomosis (n=5; 13.5%), whereas in CAT III (n=20), most patients require Ileostomy (n=14; 70%). Overall complications are more with CAT III (n=12; 60%) compared to CAT I (n=08; 17%) and CAT II (n=10; 26.31%) ($p<0.001$). Wound infection being most common complication (n=24; 22.85%), while fecal fistula more common with resection anastomosis (n=5; 21.73%) followed by primary repair (n=7; 14.89%). Mortality maximum with CAT III patients (n=6; 30%) ($p<0.05$). Stoma related complications mostly seen in CAT III. Among CAT II, two patients (5.2%) develop intra-abdominal abscess and two patients (5.2%) undergone stoma revision.[28]

MATERIALS AND METHODS

This was a prospective study for the period of 1 year study (1st Nov 2018 to 31st Oct 2019) and after that 3 month follow-up was conducted in department of surgery in Dayanand Medical College and Hospital Ludhiana. The study included patients with diagnosis of gastro intestinal perforations admitted in surgical units at DMCH.

SOURCE OF DATA

All patients with diagnosis of gastro intestinal perforations admitted at DMCH.

METHOD OF COLLECTION OF DATA

INCLUSION CRITERIA

- Age>18years
- Any duration of peritonitis

Operative Technique

-Time from admission to operation.

-Site of perforation and type of surgery

-Biopsy was taken from margin of perforation for knowing the etiology.

-Post operatively patients were followed for any complication for 3 month period.

STATISTICAL ANALYSIS:

Data was described in terms of range; mean ±standard deviation (± SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. All statistical calculations were done using SPSS (Statistical Package for the Social Science) SPSS 21 version statistical program for Microsoft Windows.

OBSERVATIONS & RESULTS

TABLE 1: AGE WISE DISTRIBUTION OF GIT PERFORATIONS

Age group	Gender		Total
	F	M	
< 20	3	2	5
21-30	6	12	18
31-40	3	2	5
41-50	6	8	14
51-60	2	15	17
61-70	6	10	16
> 70	4	6	10
Total	30	55	85

Out of 85 cases, 55 (64.7%) were males and Out of 85 cases, 55 were males and 30 (35.29%) were female.

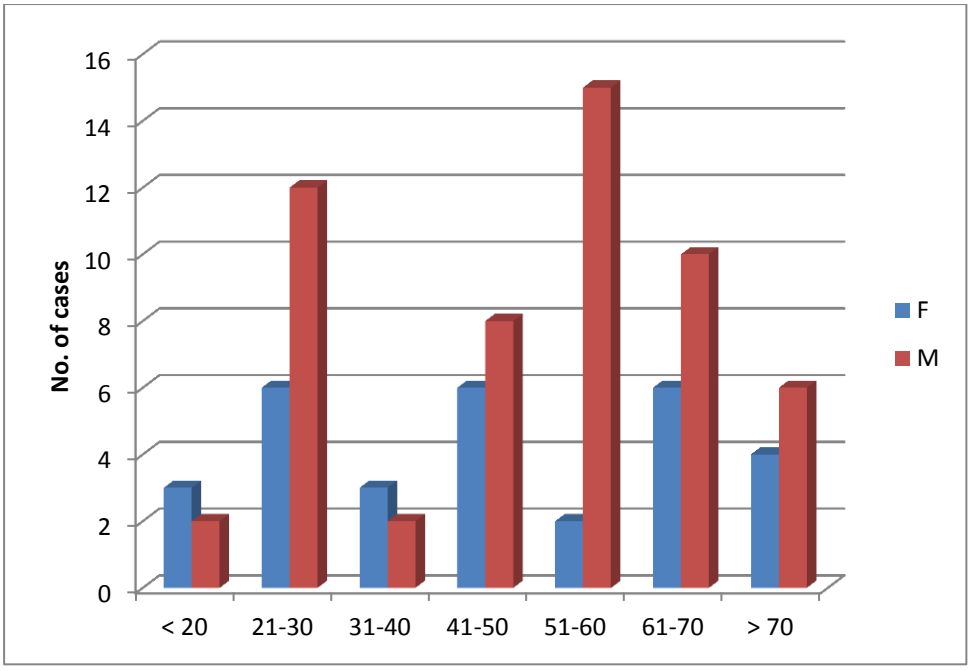

FIGURE 1: AGE WISE DISTRIBUTION OF GIT PERFORATIONS

TABLE 2: ANATOMICAL DISTRIBUTION OF GIT PERFORATIONS

site	No. of cases	Percentage
appendix	7	8.2%
caecum	1	1.2%
colon	2	2.4%
duodenum	11	12.9%
gastric	5	5.9%
ileum	38	44.7%
jejunum	10	11.8%
pylorus	4	4.7%
rectosigmoid	1	1.2%
Rectum	2	2.4%
sigmoid	4	4.7%
Total	85	100.0%

In our study maximum no of perforations are in ileum which accounts for 38(44.7%) dudenal, jejunum, appendix, gastric, pyloric and sigmoid.

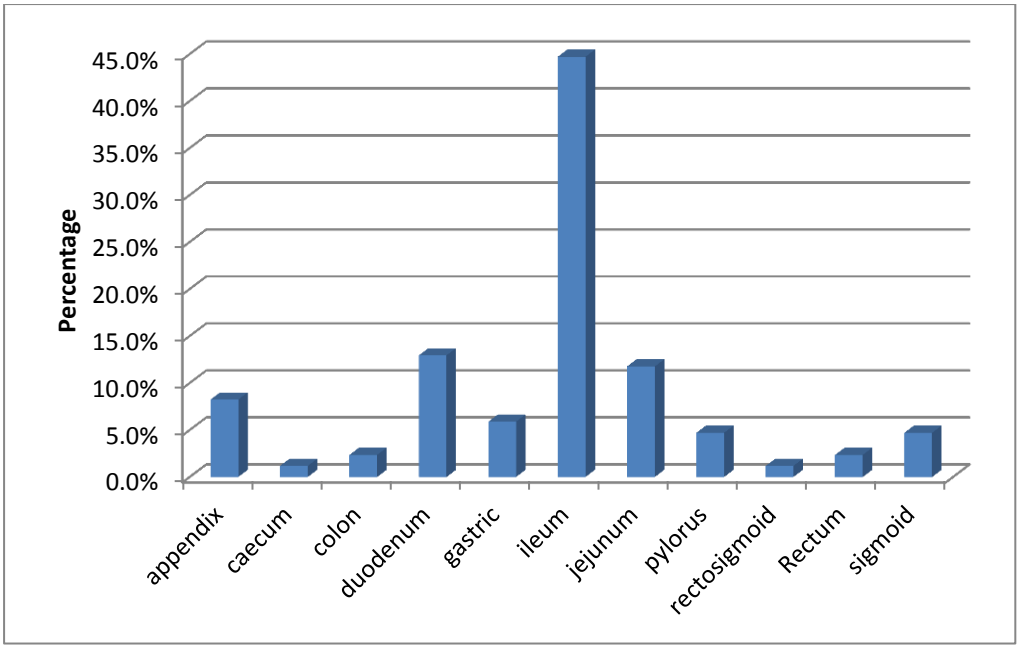

FIGURE 2: ANATOMICAL DISTRIBUTION OF GIT PERFORATIONS

TABLE 3: MONTH WISE INCIDENCE OF GIT PERFORATIONS

Month	No. of cases	Percentage
January	8	9.4%
February	2	2.4%
March	6	7.1%
April	5	5.9%
May	7	8.2%
June	4	4.7%
July	8	9.4%
August	10	11.8%
September	7	8.2%
October	6	7.1%
November	12	14.1%
December	10	11.8%
Total	85	100.0%

Out of 85 cases 12 cases occurred in the Month of November. Maximum cases occurred between august to December which is winter season.

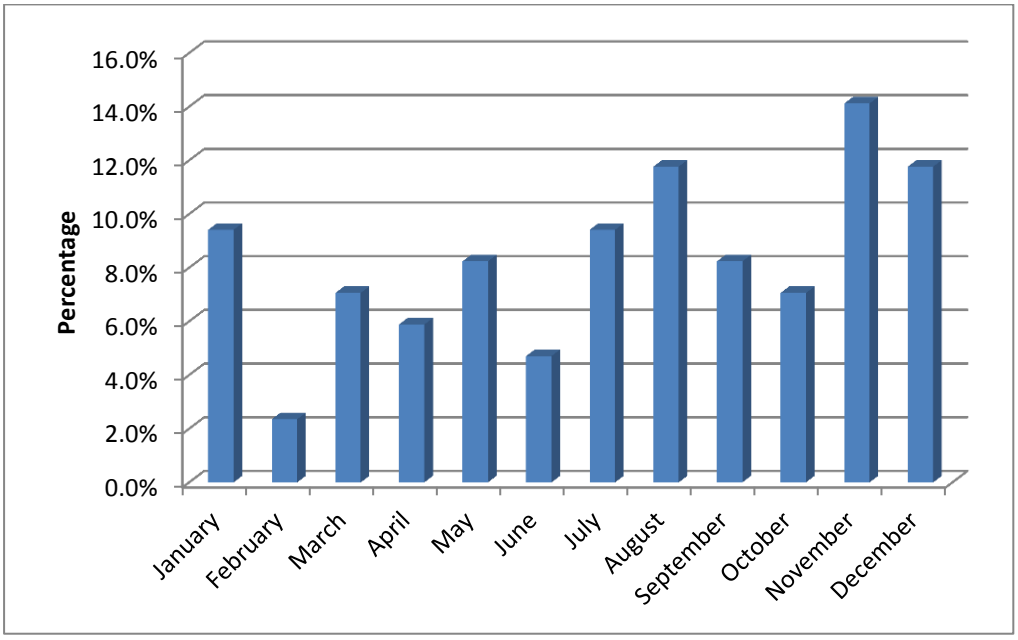

FIGURE 3: MONTH WISE INCIDENCE OF GIT PERFORATIONS

TABLE 4: TEMPERATURE VARIATIONS IN GIT PERFORATIONS

Temp. in F	No. of cases	Percentage
98*f	72	84.7%
100*f	4	4.7%
101*f	6	7.1%
102*f	3	3.5%
Total	85	100.0%

At the time of admission 98^0 f in 72 cases (84.7), 100^0 f in 4(4.7%), 101^0 f in 6(7.1%), 102^0 f in 3(3.5%) cases.

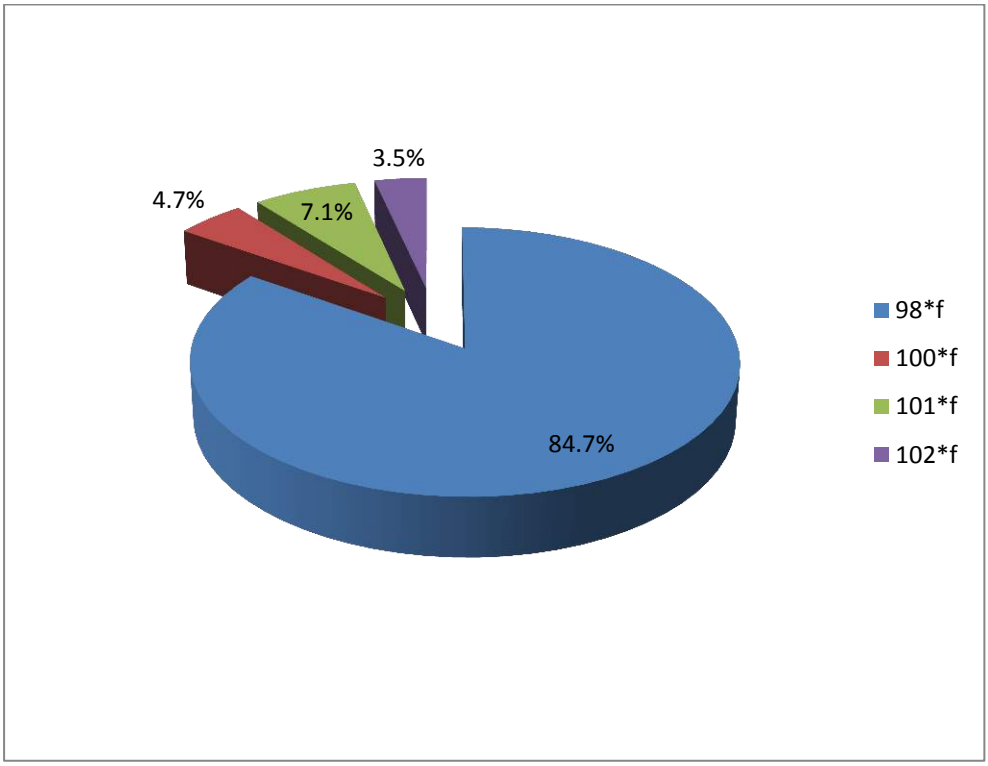

FIGURE 4: TEMPERATURE VARIATIONS IN GIT PERFORATIONS

TABLE 5: HAEMOGLOBIN LEVEL VARIATIONS IN GIT PERFORATIONS

HB GROUP	No. of cases	Percentage
< 10	29	34.1%
10-12.0	35	41.2%
> 12	21	24.7%
Total	85	100.0%

Out of 85 cases of Gastro intestinal perforation haemoglobin level was less than 10mg% in 29(34.1%) cases, between 10-12mg% in 35 (41.2%) cases, more than 12mg% in 21(24.7%) cases.

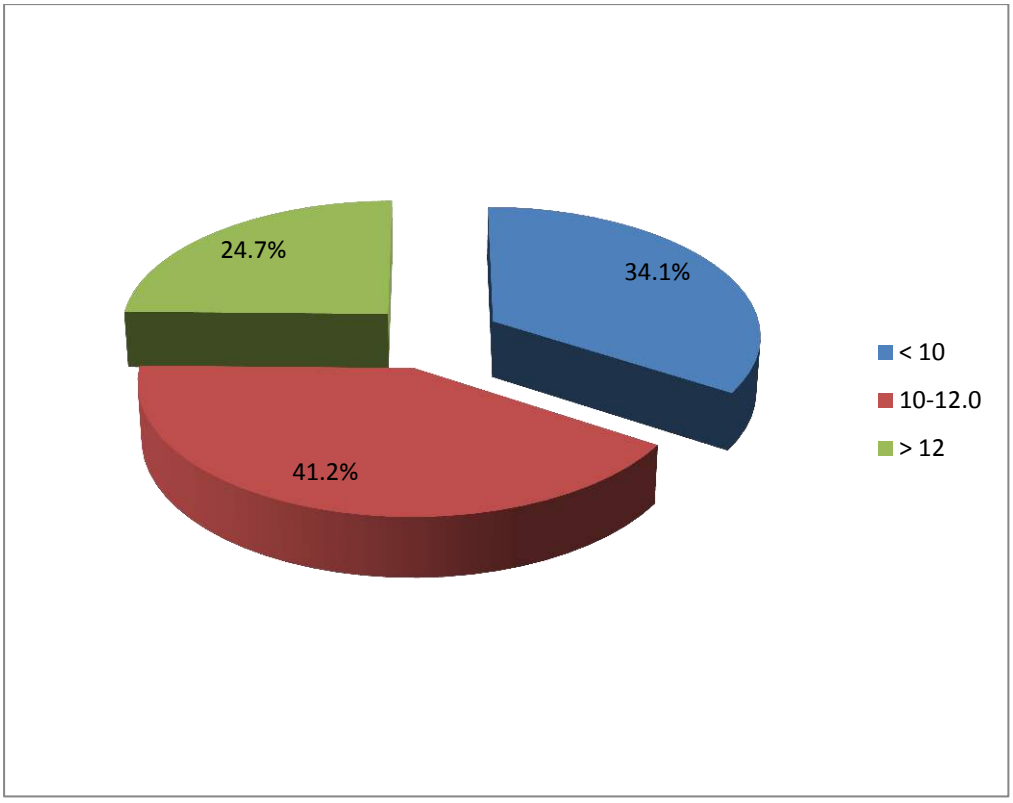

FIGURE 5: HAEMOGLOBIN LEVEL VARIATIONS IN GIT PERFORATIONS

TABLE 6: TOTAL LEUCOCYTE COUNT VARIATIONS IN GIT PERFORATIONS

TLC GROUP	No. of cases	Percentage
< 10000	40	47.1%
> 10000	45	52.9%
Total	85	100.0%

Out of 85 cases of Gastro intestinal perforation the total leucocyte count was less than 10000/C mm in in 40 (47.1%) cases and more than 10000/C mm in in 45(52.9%) cases.

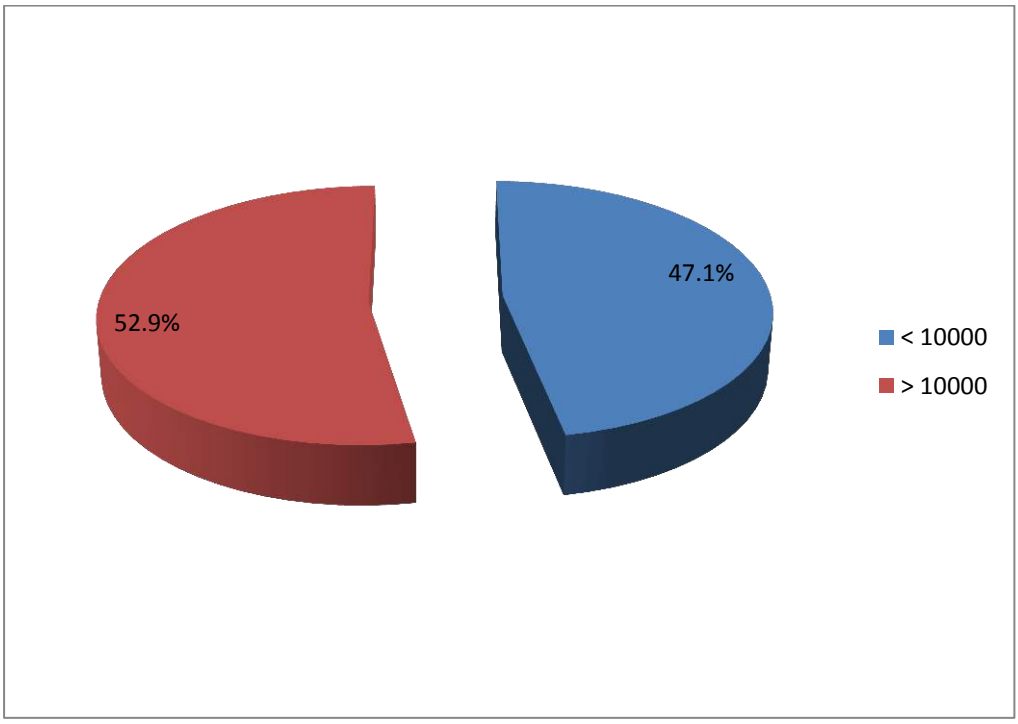

FIGURE 6: TOTAL LEUCOCYTE COUNT VARIATIONS IN GIT PERFORATIONS

TABLE 7: WIDAL TEST POSITIVITY IN GIT PERFORATIONS

Widal Test	No. of cases	Percentage
Negative	46	54.1%
Positive	39	45.9%
Total	85	100.0%

Out of 85 cases of Gastro intestinal perforation, widal test was positive in 39 (45.9%) cases.

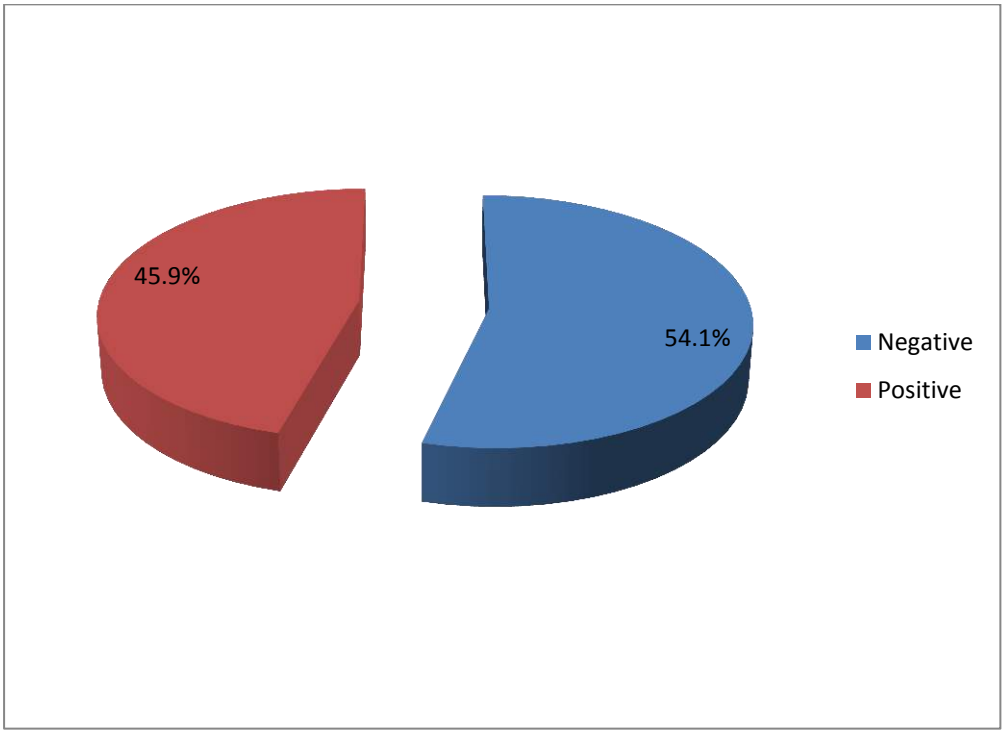

FIGURE 7: WIDAL TEST POSITIVITY IN GIT PERFORATIONS

TABLE 8: AIR UNDER DIAPHRAGM INCIDENCE

Air Diaph	No. of cases	Percentage
Absent	5	5.9%
Present	80	94.1%
Total	85	100.0%

Free air under dome of diaphragm was present in 80 cases out of 85(94.1%) cases, on plain X-ray of abdomen in erect posture.

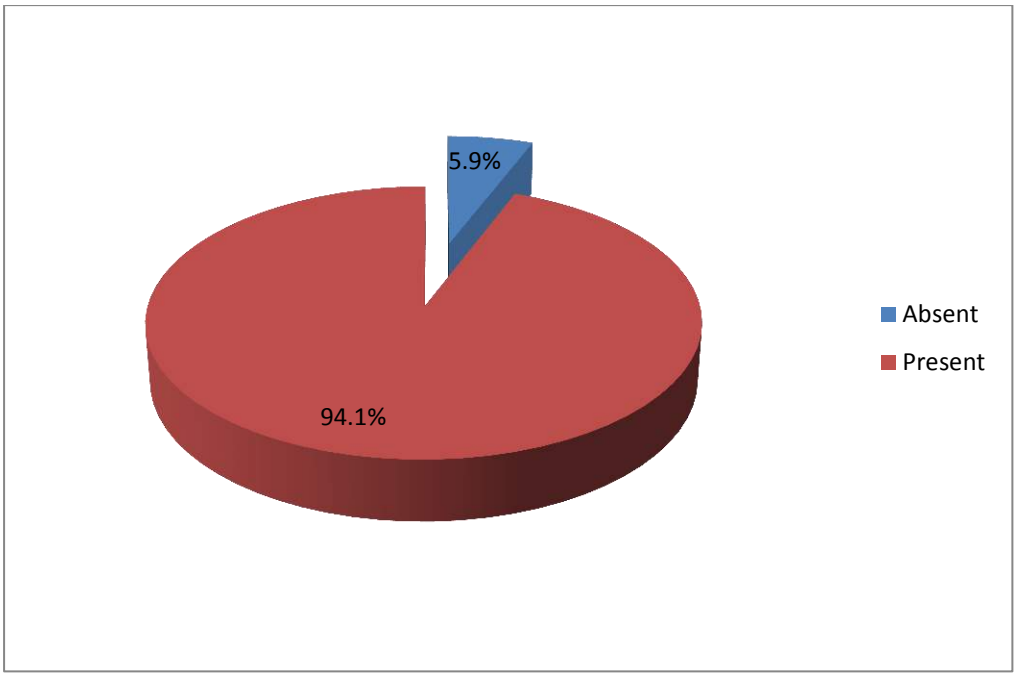

FIGURE 8: AIR UNDER DIAPHRAGM INCIDENCE

TABLE 9: ETIOLOGICAL INCIDENCE OF GIT PERFORATIONS

etiology	No. of cases	Percentage
Appendicular	7	8.2%
Diverticular	6	7.1%
Dudenal ulcer	10	11.8%
Enteric	30	35.3%
Malignant	3	3.5%
Mucormycosis	1	1.2%
Nonspecific	10	11.8%
Pyloric ulcer	4	4.7%
Traumatic	9	10.6%
Tubercular	5	5.9%
Total	85	100.0%

Enteric perforation was seen in 19 cases (12 males and 7 females) comprising 35.3% of all cases.

Dudenal ulcer perforation was seen in 10 cases (8 males and 2 females) comprising 11.8% of all cases.

Appendicular perforation was seen in 7 cases (5 males and 2 females) comprising 8.2% of all cases

Tubercular perforation was seen in 5 cases (4 males and 1 females) comprising 5.9% of all cases

Nonspecific perforation was seen in 10 cases (7 males and 3 females) comprising 11.8% of all cases.

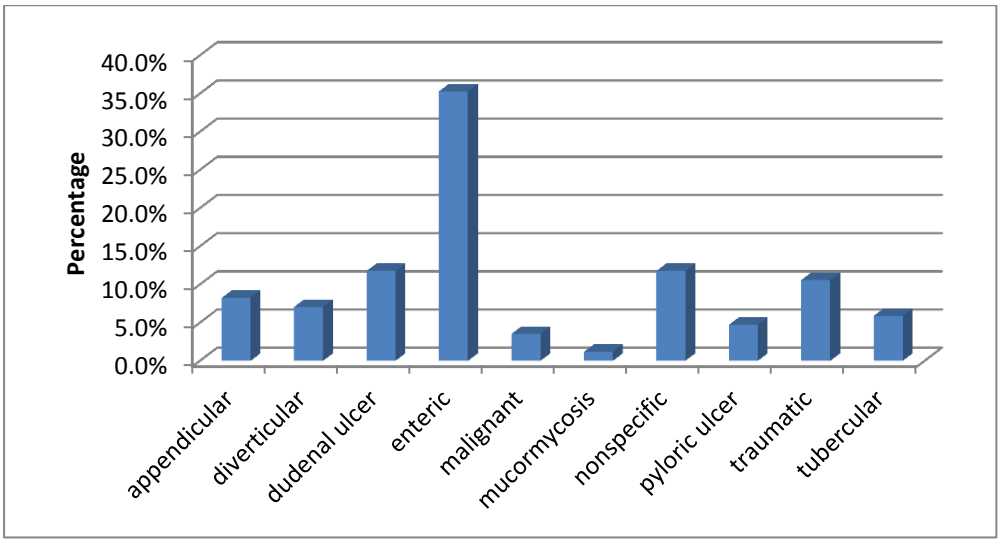

FIGURE 9: ETIOLOGICAL INCIDENCE OF GIT PERFORATIONS

TABLE 10: INCIDENCE OF MICRO ORGANISMS ISOLATED IN CULTURE

Pertonial Fluid C/S	No. of cases	Percentage
Acinetobactem baumannii	1	1.2%
Aeromonas Hydrophilia	1	1.2%
Candida tropicalis	2	2.4%
E. coli	35	41.2%
Enterobactem aeuogeus	1	1.2%
Enterobactem coccus	2	2.4%
Enterobacter cloacae	1	1.2%
Enterococcus Faecium	2	2.4%
Klebsiella pneumonia	3	3.5%
Klebsiellea SP	1	1.2%
Klebsiellia	1	1.2%
Not known	33	38.8%
Serratia Fonticela	1	1.2%
Tri Chosoporan Assahii	1	1.2%
Total	85	100.0%

In all the 85 cases of gastro intestinal perforations the peritoneal fluid was sent for culture and sensitivity. The micro-organisms cultured were E.Coli in 35(41.2%) cases, Klebsiella pneumonia in 3 cases, Candida tropicalis in 2 cases, Enterococcus Faecium in 2 cases.

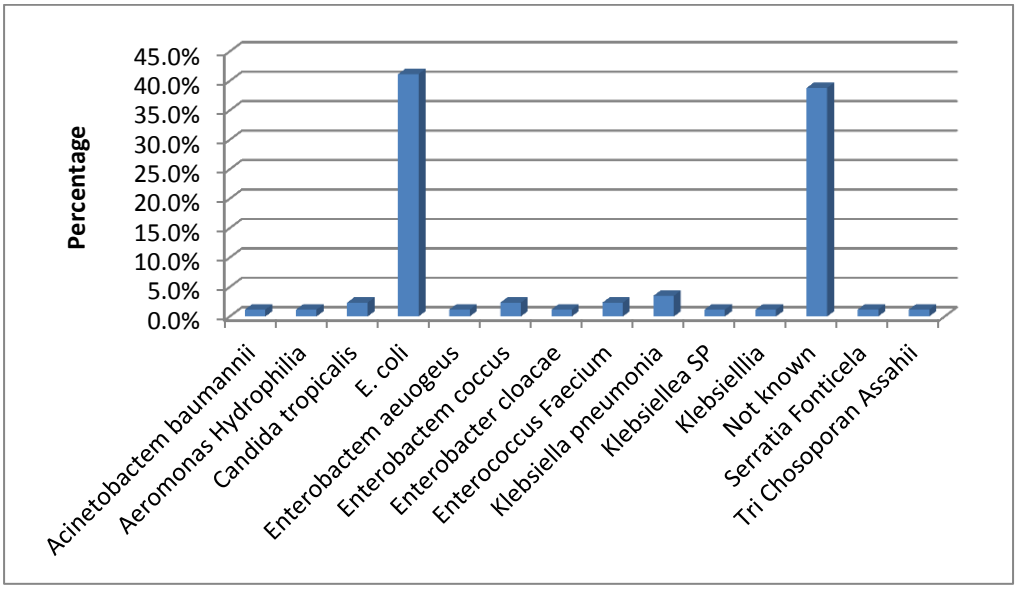

FIGURE 10: INCIDENCE OF MICRO ORGANISMS ISOLATED IN CULTURE

TABLE 11: ADMISSION OPERATION INTERVAL VARIATION

Admission Operation Interval	No. of cases	Percentage
0-2 hrs	2	2.4%
2-4 hrs	3	3.5%
4-6 hrs	13	15.3%
6-8 hrs	7	8.2%
8-10 hrs	8	9.4%
10-12 hrs	8	9.4%
12-14 hrs	8	9.4%
14-16 hrs	4	4.7%
16-18 hrs	5	5.9%
18-20 hrs	7	8.2%
20-24 hrs	7	8.2%
24-48 hrs	13	15.3%
Total	85	100.0%

All the 85 cases admitted with the gastro-intestinal perforations were operated upon. 41(48.23%) cases were operated with in 12 hours of admission, 31 (36.47%) cases were operated from 12-24 hours period, 13 (15.29%) cases were operated between 24-48 hours of admission.

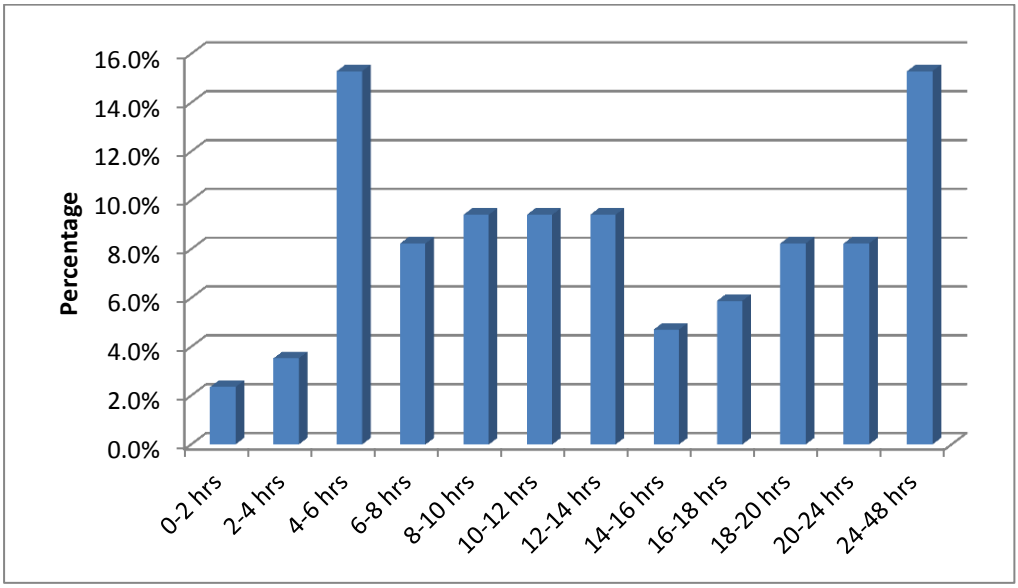

FIGURE 11: ADMISSION OPERATION INTERVAL VARIATION

TABLE 12: INCIDENCE OF COMPLICATIONS (MORBIDITY)

Complications	No. of cases	Percentage
ABSENT	39	45.9%
BURST ABDOMEN	2	2.4%
HYPERPYREXIA	11	12.9%
PARA STOMAL HERNIATION	2	2.4%
PERISTOMAL SKIN INFECTION	7	8.2%
RESPIRATORY	10	11.8%
UTI	6	7.1%
WOUND INFECTION	8	9.4%
Total	85	100.0%

Out of 85 cases of gastro intestinal perforations, post operative complications occurred in 46 (54.1%) cases but rest of the 39 cases had an uneventful post operative period.

Hyperpyrexia occurred in 11 cases, Respiratory complications in 10 cases, wound infection in 8 cases, Peristomal skin infection in 7 cases, Urinary infection in 6 cases, Para stomal herniation and Burst abdomen in 2 cases each.

FIGURE 12: INCIDENCE OF COMPLICATIONS (MORBIDITY)

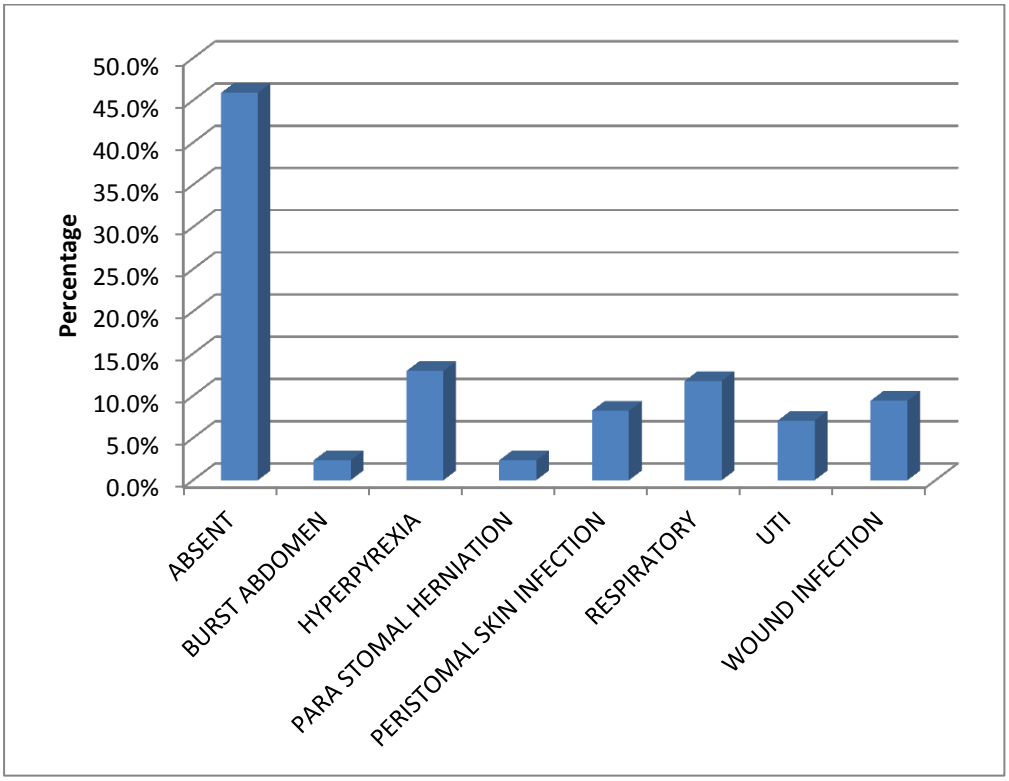

TABLE 13: INCIDENCE OF MORTALITY

Outcome	No. of cases	Percentage
Discharged	71	83.5%
Expired	14	16.5%
Total	85	100.0%

Out of 85 cases of gastro intestinal perforation 14 cases were died, accounting for a mortality rate of 16.5%,who died include 5 cases of enteric,2 appendicular, diverticular and non specific each,1 traumatic, tubercular and mucormycosis each.

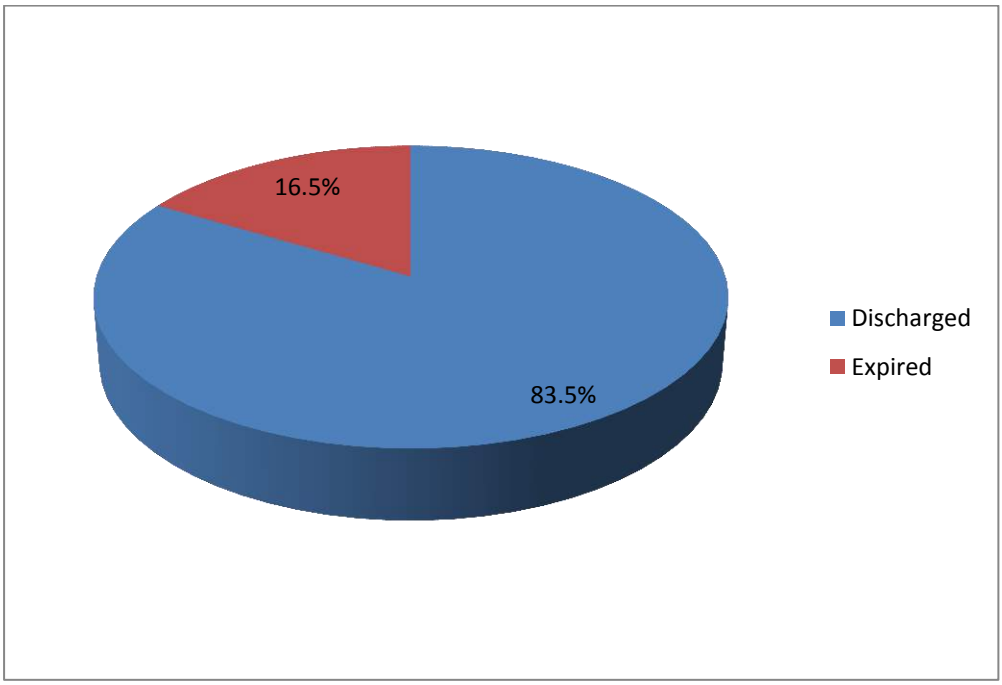

FIGURE 13: INCIDENCE OF MORTALITY

TABLE 14: SCOPE OF VARIOUS OTHER PARAMETERS

	N	Minimum	Maximum	Mean	Std. Deviation
Age	85	17	85	49.59	18.858
Pulse	85	68	146	100.44	19.291
Temp. in F	85	96	100	97.30	.644
hb	85	5	16	10.76	2.207
TLC	85	2.1	25.7	11.255	4.7732
Urea	85	10	210	53.98	39.326
Admission Operation Interval	85	2	47	15.32	9.826
Stay in Hospital (Days)	85	2	20	10.07	4.832

This chart showed the scope of various other parameters in our study from minimum to maximum variation.

TABLE 15: MONTHWISE INCIDENCE OF PERFORATIONS ON THE BASIS OF ETIOLOGY

Month	etiology										Total
	appendicular	diverticular	dudenal ulcer	enteric	malignant	mucormycosis	nonspecific	pyloric ulcer	traumatic	tubercular	
January	2	0	0	2	1	0	0	1	2	0	8
February	0	0	0	0	0	0	0	1	1	0	2
March	1	0	1	3	0	0	0	0	1	0	6
April	0	1	0	2	0	0	0	0	1	1	5
May	1	1	1	1	0	0	0	0	2	1	7
June	0	0	1	2	0	0	1	0	0	0	4
July	0	0	2	3	0	1	2	0	0	0	8
August	0	1	2	6	1	0	0	0	0	0	10
September	2	0	0	0	1	0	1	0	1	2	7
October	0	0	1	2	0	0	3	0	0	0	6
November	0	2	1	4	0	0	2	1	1	1	12
December	1	1	1	5	0	0	1	1	0	0	10
Total	7	6	10	30	3	1	10	4	9	5	85

This is monthwise incidence of perforations as maximum number of perforations had occurred from august to december. Maximum no of case spike is seen in august and december month.

FIGURE 14: MONTHWISE INCIDENCE OF PERFORATIONS ON THE BASIS OF ETIOLOGY

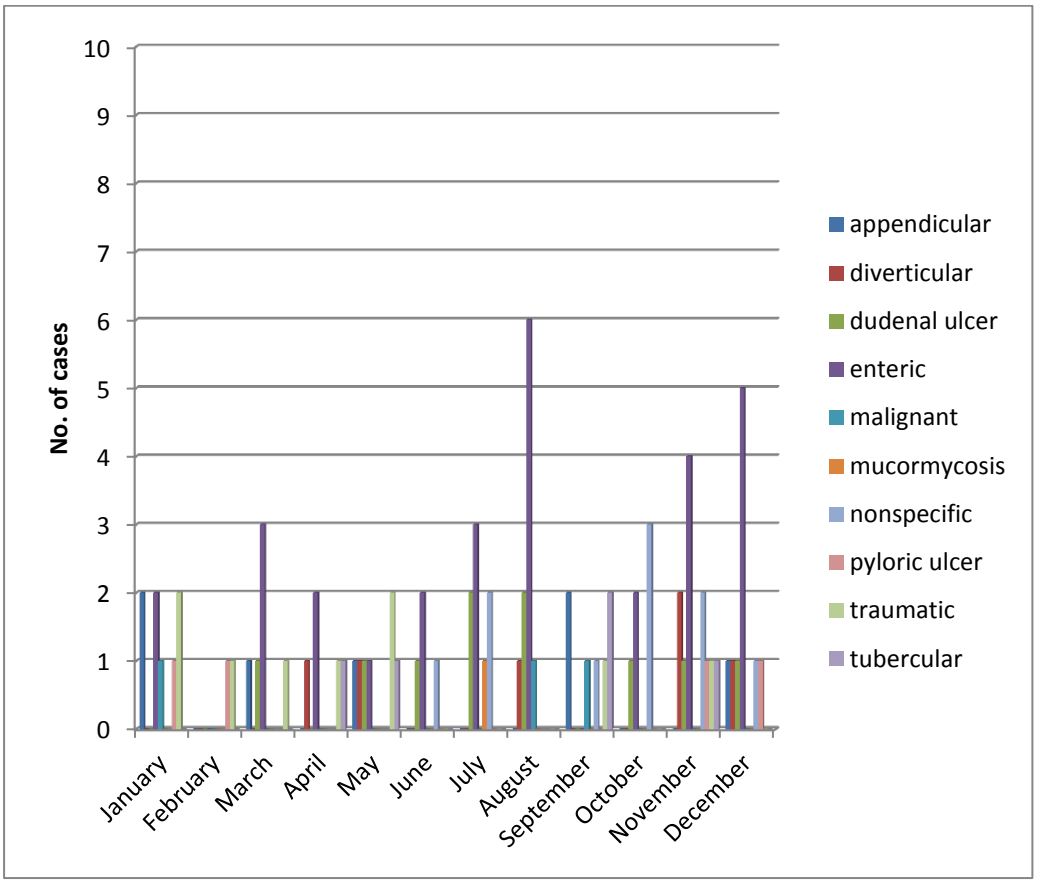

TABLE 16: VARIOUS OPERATIVE PROCEDURES ADOPTED IN THIS STUDY

ETIOLOGY	OPERATIVE PROCEDURE	NO OF CASES
ENTERIC PERFORATION	1 SIMPLE CLOSURE+DRAINAGE 2 RESECTION+END TO END ANASTOMOSIS	22 8
TUBERCULAR PERFORATION	1 SIMPLE CLOSURE+DRAINAGE 2 RESECTION+END TO END ANASTOMOSIS	2 3
PEPTIC PERFORATION	SIMPLE CLOSURE + OMENTOPLASTY	20
TRAUMATIC PERFORATION	1 SIMPLE CLOSURE+DRAINAGE 2 SIMPLE CLOSURE+TRANSVERSE COLOSTOMY	4 5
APPENDICULAR PERFORATION	APPENDISECTOMY +DRAINAGE	7
MALIGNANT PERFORATION	RESECTION +END COLOSTOMY WITH HARTMAN"S PROCEDURE	3
DIVERTICULAR PERFORATION	RESECTION+ END TO END ANASTOMOSIS	6

Out of 30 cases of enteric perforation 22 cases was closed with atraumatic needle in two layers (first layer with catgut and second layer with silk) after taking a piece from perforation for histopathology except in 8 cases where resection and anastonosis was done because of more than one perforations and poor condition of ileum. Peritoneal cavity was drained in all the cases

All 20 cases (11 dudenal, 5 gastric and 4 pyloric) cases were treated with simple closure with omentoplasty.

For all cases of appendicular perforation, appendicectomy was done.

Local resection and end to end anastomosis is the recommended treatment for diverticular Perforations.

DISCUSSION

Eighty five cases of gastro intestinal perforations were studied. In this study maximum incidence was of enteric perforations followed by duodenal, traumatic, appendicular, diverticular, tubercular, pyloric, malignant, mucormycosis perforations in order.

TABLE 17: ANATOMICAL SITE OF PERFORATIONS

site	No. of cases	Percentage
Ileum	38	44.7%
Duodenum	11	12.9%
Jejunum	10	11.8%
Appendix	7	8.2%
Gastric	5	5.9%
Pylorus	4	4.7%
Sigmoid	4	4.7%
Rectum	2	2.4%
Colon	2	2.4%
Caecum	1	1.2%
Rectosigmoid	1	1.2%
Total	85	100.0%

AGE INCIDENCE IN THIS STUDY

Age in years	Dhanapal Pattanam Velappan (2017)[21] 100 cases	M.C. Dandapat et al (1991) [29] 340 cases	Present study (2018) 85 cases
<20 yrs	14 (14 %)	48(14.1%)	5 (5.9%)
20-40 yrs	45(45%)	208(61.17%)	23 (27%)
40-60 yrs	31(31%)	82(24%)	31(36.5%)
>60 yrs	10(10%)	-	26 (30.5%)

In the present study, the youngest patient was 13 yrs and eldest was 78 yrs. The maximum age incidence in this study was between 40 to

60 yrs. The other studies observed an age trend between 20 to 40 yrs (Dhanapal Pattanam Velappan et al[21], M.C Dandapat et al[29]) and 40 to 60 yrs (Rajender S Jhobta[1]).

Mewara BC et al 2017, The maximum number of patients in study was in age group of 31- 40 years (23%) with a mean age of 40.29, years. There were 89 males (89%) as compared to 11 females (11%).[15]

SEX INCIDENCE

Sex	M.C. Dandapat et al (1991) [29] 340 cases	Rajender S Jhobta et al [1] (2006) 504 cases	Present study (2018) 85 cases
Male	304 (89.4%)	423 (84%)	55 (64.7%)
Female	36 (10.6%)	71 (16%)	30 (35.3%)

The ratio of men to women with all types of perforation irrespective of etiology of perforation is 11:6 in our study. M.C Dandapat et al[29] reported a sex incidence of 8.4:1 and Rajender S Jhobta et al[1] reported a ratio of 5.2:1

Mewara bc et al 2017[15], There were 89 males (89%) as compared to 11 females (11%).

ILEAL PERFORATION

38 cases of ileal perforations were included in the study.

AGE INCIDENCE IN ENTERIC PERFORATION

S NO	AGE (YEAR)	NO OF CASES	PERCENTAGE
1	18-29	11	28.9
2	30-39	3	7.9
3	40-49	5	13.2
4	50-59	7	18.4
5	60-69	9	23.7
6	>70	3	7.9
	TOTAL	38	100

More common age group is 18-29 years. 24 male and 14 female cases were studied with a male: female ratio of 12:7 the youngest case was 19 years and eldest case was 80 years, Average age was 49.58 years.

SEX DISTRIBUTION IN ILEAL PERFORATION

S NO	SEX	NO OF CASES
1	MALE	24
2	FEMALE	14
	TOTAL	38

18 patients had history of fever for 2 weeks and 29 patients were diagnosed as typhoid positive by widal test.

COMPARATIVE STUDY OF TYPHOID PERFORATIONS

study	Age avg in years	M:f
Adesunkanmi AR, Ajao O G J R Coll Surg Edind. 1997[8]	19.5	4:1
Salih Hosoglu, Mustafa Aldemin Am. Jou. of Epidemiology 2004[16]	28.2	4:1
This study	36.14	7.5:2

DISTRIBUTION OF ILEAL PERFORATIONS

DISEASE	NO OF CASES	PERCENTAGE
TYPHOID	36	94.70
TUBERCULOSIS	5	13.15
TRAUMATIC	1	2.6
OTHER	3	7.9

Shashank Nahar, Alok Ranjan et al 2017[17] also reported Typhoid fever was the commonest cause of ileal perforation in 24 (80%) patients. Our study also showed similar results i.e typhoid was the cause of perforation almost in 36 cases i.e (94.7%) of ileal perforations.

22 cases underwent perforation closure in two layers using 2.0 vicryl and 3.0 silk. Peritoneal toileting was done for all cases. 3 patients developed post operative wound infection. 5 cases expired due to septicemia.

RADIOLOGICAL SIGNS

The plain X-ray abdomen of 32 patients showed gas/air under diaphragm.

Pneumoperitoneum in ileal Perforation

Gas under diaphragm	No of cases	percentage
Present	33	86
absent	5	14

COMPARATIVE STUDY

STUDY	PNEUMOPERITONEUM
Grassir, Romano S, Pinto A, Romano L Eur. J. Radiology. 1998[30]	46%
This study	86%

TIME INTERVAL BETWEEN ADMISSION AND SURGERY

TIME INTERVAL IN HOURS	SURGERY	NO OF CASES	PERCENTAGE
0-4	IMMEDIATE	5	13.15
4-24	SAME DAY	32	84.21
>24	DELAYED	1	2.6

The peritoneal soiling was less than 500 ml in 6 cases.

QUANTITY OF PERITONEAL SOILING	NO OF CASES	PERCENTAGE
<500	6	15.7%
500-2000	24	63.15%
>2000	8	21%

POST-OPERATIVE COMPLICATIONS IN ILEAL PERFORATION

COMPLICATIONS	NO OF CASES	PERCENTAGE
Wound Infection	3	7.8
Basal pneumonitis	4	10.5
Burst Abdomen	1	2.6

Total 6 patients 17% cases of ileal perforations developed complications.

3 patients developed post operative wound infection. 5 cases expired due to septicemia and 1case due to Tuberculosis..

DUODENAL PERFORATION

The 2nd common cause in this study of gastrointestinal perforations was duodenal perforation. It accounted for 11 out of 85 cases (12.9%). There were 11 cases of perforation, 10 as complication of duodenal ulcer and 1 traumatic.

AGE DISTRIBUTION OF DUODENAL PERFORATION

S NO	AGE (YEARS)	NO OF CASES	PERCENTAGE
1	18-29	1	9.1
2	30-39	1	9.1
3	40-49	1	9.1
4	50-59	3	27.3
5	60-69	5	45.5
	TOTAL	11	100

Duodenal perforations were more common in the age group of 60–69 years. The youngest case was 17 years and eldest case was 67 years.

COMPARATIVE STUDY

STUDY	MEAN AGE
Plummer, JM, McForlane ME, Nuwnham West Indian Med. J.2004[9]	Male : < 50 Female : > 50
Ersumo D. W, Meskel, Y, Kotisso B, Ethiop Med. J. 2005[10]	32.5
D S Canoy, A R Hart, C J Todd 2002[31]	Male : 67.7 Female : 76.6
THIS STUDY	53.36

SEX DISTRIBUTION

In our study, the duodenal perforation ratio in Male : Female was 8:3

S NO	SEX	NO OF CASES
1	MALE	8
2	FEMALE	3
	TOTAL	11

COMPARATIVE STUDY

STUDY	M:F
Ersumo D. W, Meskel, Y, Kotisso B, Ethiop Med. J. 2005[10]	7.2:1
Plummer, JM, McForlane ME, Nuwnham West Indian Med. J. [9]	9:1
D S Canoy, A R Hart, C J Todd 2002[31] NORFOLK UK	53:47
This study	8:3

SOCIO ECONOMIC STATUS:

7 patients belonged to low socio economic group.

4 patients were from rural area.

6 cases were smokers and 4 cases gave history of alcohol consumption while 5patients gave history of alcohol intake before the perforation. 9 cases gave history of symptoms suggestive of peptic ulcer disease and 3 patients gave history of drug intake.

COMPARATIVE STUDY

study	rural
Ersumo T. W, Meskel, Y, Kotisso B, Ethiop Med. J. 2005[10]	78%
This study	80%

RADIOLOGICAL SIGNS

The plain X-ray abdomen of 9 patients showed gas under diaphragm.

PNEUMOPERITONEUM IN DUODENAL PERFORATION

Gas under diaphragm	No of cases	percentage
Present	9	81.81
absent	2	18.18

COMPARATIVE STUDY

STUDY	PNEUMOPERITONEUM
Grassir, Romano S, Pinto A, Romano L Eur. J. Radiology. 2004[11]	85.5%
This study	81.81

All the 11 cases underwent operative management. 3 cases underwent immediate surgery, 7 cases on the same day and 1 case underwent delayed surgery.

TIME INTERVAL BETWEEN ADMISSION AND SURGERY

TIME INTERVAL IN HOURS	SURGERY	NO OF CASES	PERCENTAGE
0-4	IMMEDIATE	3	27.27
4-24	SAME DAY	7	63.63
>24	DELAYED	1	9.09

2 cases had sealed perforations which were reinforced with omental patch. In 3 cases whose general condition did not warrant anesthesia bilateral flank drainage was done. For the other 6 cases, simple closure of the perforation using 2 0 vicryl with live omental patch (Graham's patch) was done. The peritoneal soiling was less than 500 ml in 2 cases.

The peritoneal soiling was less than 500 ml in 2 cases.

QUANTITY OF PERITONEAL SOILING

QUANTITY OF PERITONEAL SOILING	NO OF CASES	PERCENTAGE
<500 (ml)	2	18.18%
500-2000 (ml)	6	54.54%
>2000 (ml)	3	27.27%

No patient had previous or multiple perforations. In all cases, peritoneal toileting was done.

COMPARISON OF PERFORATION SIZE AND PERITONEAL SOILING

Average size of the Perforation	Average Quantity of Soiling in ml
<5mm	950
5-10mm	1500
>10mm	2200

One case with history of left sided inguinal hernia presented with clinical features suggestive of obstruction. X-ray of the patient did not reveal pneumoperitoneum. On Inguinal exploration of the obstructed hernia, the sac contained 250ml of pus with occlusion of its neck. Later, on laparotomy there was a 0.5 cm perforation in the first part of duodenum. The obstruction might have been precipitated by the muscular rigidity following perforation.

All the cases were advised to continue H2 blockers or proton pump inhibitors and a course of H.pylori eradication therapy.

5 patients developed post operative complications - wound infection (3 cases), right basal pneumonitis (1 case), burst abdomen (1 case).

POST-OPERATIVE COMPLICATIONS IN DUODENAL PERFORATION

COMPLICATIONS	NO OF CASES	PERCENTAGE
Wound Infection	3	27.27
Basal pneumonitis	1	9
Burst Abdomen	1	9

Out of total 11 cases 1 patient expired, 4 of which were the patients treated by flank drainage alone.

JEJUNAL PERFORATION

A total of 10 cases of jejunal perforation were in the study group.

AGE INCIDENCE:

S NO	AGE	NO OF CASES	PERCENTAGE
1	18-29	3	30%
2	30-39	0	0%
3	40-49	2	20%
4	50-59	1	10%
5	60-69	0	0%
6	> 70	4	40%
	TOTAL	10	100

More common in the 7TH decade.

Male : Female ratio of 6:4

SEX DISTRIBUTION OF JEJUNAL PERFORATIONS

S NO	SEX	NO OF CASES
1	MALE	6
2	FEMALE	4
	TOTAL	10

Studies in the past on age and sex incidence has showed similar results as our study.

A total of 10 cases were included in the study.

1 case was a sequlae of post gastro-jejunostomy and 1 case associated with a Jejunal diverticulum.

6 cases were treated by perforation closure in two layers using 2.0 vicryl and 3.0 silk and the 4 cases underwent resection anastomosis.

Post operatively 6 cases developed complications like respiratory problems, UTI and fever. 3 patients expired.

APPENDICULAR PERFORATION

A total of 7 cases of Appendicular perforation were in the study group.

AGE INCIDENCE:

S NO	AGE (YEAR)	NO OF CASES	PERCENTAGE
1	18-29	1	14.3%
2	30-39	2	28.6%
3	40-49	1	14.3%
4	50-59	0	0%
5	60-69	1	14.3%
6	> 70	1	14.3%
	TOTAL	7	100

More common in the 3rd decade.

Male : Female ratio of 6:1

Appendicular perforation was seen in younger age group in our study, same as the incidence which was observed by Dandapata[29] and Rajender S Jhobta[1].

SEX DISTRIBUTION OF APPENDICULAR PERFORATIONS

S NO	SEX	NO OF CASES
1	MALE	4
2	FEMALE	3
	TOTAL	7

The M : F ratio in our series was 4:3. In this study total leucocyte count was more than 10,000 in 66.66% and less than 10,000 in 33.33% patients in appendicular perforations.

In this study also, no free-air was detected in any case, under the right dome of the diaphragm on plain X-ray of abdomen in erect posture.

The bacterial flora found in perforated appendix is a mixed colonic flora with both aerobic organisms. The organism cultured in this study was E.Coli in 100% cases. Greenall, M.J. (1978) [32] also reported E. coli in

48% cases and bacteroides species in 12% cases. Other authors like Haller, J.A. (1973) [33]; reported similar findings.

In this study appendicectomy was done with drainage. 2 patients expired in our study.

The mortality is less than 2.3% in our study.

5 patients had symptoms lasting for more than 48 hours before hospitalization.

3 patients had faecolith obstruction.

All patients were treated by appendectomy with peritoneal toileting.

1 case developed wound infection post operatively, 1 developed parastomal herniation, 1 UTI and 1 developed respiratory infection.

GASTRIC PERFORATION

A total of 5 cases of gastric perforation were in the study group.

AGE INCIDENCE:

S NO	AGE (YEAR)	NO OF CASES	PERCENTAGE
1	18-29	2	40%
2	30-39	0	0%
3	40-49	2	40%
4	50-59	0	0%
5	60-69	1	20%
	TOTAL	5	100

More common in the 4th decade.

Male : Female ratio of 4:1

SEX DISTRIBUTION OF GATRIC PERFORATIONS

S NO	SEX	NO OF CASES
1	MALE	4
2	FEMALE	1
	TOTAL	5

2 cases were smokers and 3 cases were alcoholic.

PNEUMOPERITONEUM IN GASTRIC PERFORATION

GAS UNDER DIAPHRAGM	NO OF CASES	PERCENTAGE
POSITIVE	4	80
NEGATIVE	1	20

Plain upright X-ray of the abdomen showed air under the diaphragm in 4 cases.

COMPARATIVE STUDY

STUDY	PNEUMOPERITONEUM
Grassir, Romano S, Pinto A, Romano L Eur. J. Radiology. 2004[11]	85.5%
Rodrignez – Sanjuan J.C. 2009[14]	96%
THIS STUDY	80%

All patients were treated by simple closure with omental patch.3 patients had traumatic perforation. 2 patients developed post operative complication, wound infection and fever. 1 patient had burst abdomen and expired.

PYLORIC PERFORATION

A total of 4 cases of pyloric perforation were in the study group.M:F ratio was 3:1.

2 cases were smokers and 2 cases were alcoholic.

plain upright x-ray of the abdomen showed air under the diaphragm in all cases.

All patients were treated by simple closure with omental patch.

3patients developed post operative complications like fever and UTI.

COLONIC PERFORATION

10 cases of colonic perforations from caecum till rectum were encountered in the study period. 2 case of traumatic injury with a tear of 0.5 cm in the descending colon with no peritoneal contamination which was closed primarily. 2 cases were of malignant in origin.

The other case had perforation in the rectosigmoid of diverticular etiology, treated by proximal colostomy. Patient had post operative wound infection. Rest cases were non specific.

ETIOLOGICAL INCIDENCE OF PERFORATIONS

etiology	No. of cases	Percentage
enteric	30	35.3%
dudenal ulcer	10	11.8%
nonspecific	10	11.8%
traumatic	9	10.6%
appendicular	7	8.2%
diverticular	6	7.1%
tubercular	5	5.9%
pyloric ulcer	4	4.7%
malignant	3	3.5%
mucormycosis	1	1.2%
Total	85	100.0%

The important causes of gastro-intestinal perforations in our country are enteric, peptic ulceration, tubercular, traumatic. Dickson et al.(1964) [34] added trauma and malignancy to the above list.

In this study maximum incidence was of enteric perforations followed by duodenal, traumatic, appendicular, diverticular, tubercular, pyloric, malignant, mucormycosis perforations in order. We did not encounter a single Case of amoebic perforation. This may be because of use of metronidazole in the early part of the disease.

Shashank Nahar, Alok Ranjan et al 2017 also reported Typhoid fever was the commonest cause of ileal perforation in 24 (80%) patients. Our study also showed similar results i.e typhoid is cause of perforation almost in 36 cases i.e (94.7%) of ileal perforations. [17]

Malhotra MK et al 2016, The most common cause of perforation peritonititis noticed in our series was peptic ulcer perforation 43 cases (46%), followed by ileal perforation 30 cases (32%), appendicular

perforation 6 cases (6.4%), gallbladder perforation 5 cases (5.3%) and all the jejunal perforation 6cases (6.4%) were post traumatic.[20]

Jhobta RS et all 2006, the most common cause of perforation in our series was perforated duodenal ulcer (289 cases) followed by appendicitis (59 cases), gastrointestinal perforation due to blunt trauma abdomen (45 cases), typhoid fever (41 cases) and tuberculosis (20 cases). [1]

Thammegowda Kemparaj et al (2016) reported in their study of 381 patients, 40% of patients had duodenal, 34% had ileal, 11% appendicular, 6% gastric, 6% jejunal and 3% had colonic perforations. Our study also reported similar results as ileal 44.7%,appendicular 8.2%,gastric 5.9%,jejunal 11.8%.[4]

Tubercular perforations accounted for 6% of gastro intestinal perforations seen in this study.

The incidence of tubercular perforation was reported 0.5% by Dandapat, M.C.(1991) [29].

The 2nd (duodenal 11+gastric 5) common cause in this study of gastrointestinal perforations was peptic ulcer perforation. It accounted for 16 out of 85 cases (18.8%) in our study.

Dandapat M.C. et al (1991) [29] reported that amongst the gastro intestinal perforations, the commonest was peptic ulcer perforation which accounted for 79.4% of all the perforations of gastro intestinal tract.

In this study Perforated peptic ulcer occurred in 4th decades of life. Other workers viz, P. Anseline (1977) [35], R. Heuman (1983) [36]; Dandapat et al (1991) [29] also reported that majority of patients presented in the 3rd and 4th decades and the age range was 20 - 60 years.

Dandapat, et al (1991) [29] reported M:F ratio of 8.4 : 1.

Heuman R et al (1983) [36] noted 87% of the patients were smokers at the time of duodenal ulcer perforation. In this study 55.55% cases were smoker & 44.4% were alcoholics. All the cases were taking spices & chillies in there diet with lesser quantity of milk.

The fourth common cause of gastro-intestinal perforation in this study was appendicular perforations (8.2%). The unrelenting obstruction of the appendiceal lumen leads to gangrene and rupture of the pus filled organ. The main causes of obstruction of the appendiceal lumen are faecolith, foreign bodies like food debris, gall stones, worms, congenital bands & adhesions kinking the appendix, growth of Caecum of base of appendix, appendix in the strangulated hernial sac and hyperplasia of submucus lymphoid follicles. In this study the cause of obstruction was faecoliths.

The M : F ratio in our study was 6:1. In this study total leucocyte count was more than 10,000 in 52.9% and less than 10,000 in 47.1% patients.

Fever, tachy cardia and leucocytosis develop as a consequence of absorption of dead tissue products and bacterial toxins.

In this study most important symptoms were abdominal pain & distension. These findings are in agreement with those of others (Gupta S.D., 1977[37]; Lawrence and Walker, 1976 [38]).

In a prospective study of 1200 routine small bowel examinations, Parulkar (1972) [13] found 15 cases of acquired diverticula and out of these 8 patients had perforation.

ENTERIC PERFORATIONS

In this study enteric perforations topped the list (30 out of 85 cases), accounting for 35.3% of all cases. This reflects that typhoid fever is still a major disease in India. Archampong, E.Q.(1976) [39], Chouhan, M.K.(1982) [40], Dickson and cole (1964) [34], also reported that in the tropics, typhoid fever still remained the commonest cause of non traumatic ileal perforations.

SEX INCIDENCE:

Males outnumbered females in a M : F ratio of 17:13. The heavy preponderance of males over females conforms to the general pattern of occurrence of the disease and also the admission pattern of the hospital.

The maximum number of patients were in 2nd and 3rd decades of life. Archampong, E.Q.(1976) [39], Singh & Singh (1975) [41], showed maximum incidence in 2nd & 3rd decades.

PERIODICITY:-

In this study 73.8% cases occurred between the months of august to December. This was the monsoon rainy season in this part of country when varying degree of flooding lead to contamination of water and food.

Clinical Features:

The diagnosis seldom posed any problem. History of prolonged and continuous fever followed by severe pain in the abdomen were the most important features of diagnosis. Most of the symptoms and signs are fairly constant in all the studies (Archampong, 1976[39]; Dickson and Cole, 1964[34]). Archampong, E.Q. (1976) [39] reported in 7.5% cases.

Peritoneal Tapping:

Four quadrant peritoneal tapping was done in all the cases. It was positive in 95.2% cases of enteric perforations. It was seropurulent and foul smelling in majority. (Arechampong, E.Q, 1976) [39]. Singh & Singh(1975) [41] also reported free fluid of seropurulent foul character recovered by paracentesis in all cases.

Socio economic Status:

About 71.4% cases belonged to low socio economic status and 28.5% cases were taking Dhaba diet indicating the increased incidence of typhoid fever with the intake of contaminated Water & food and poor personal hygiene. Similar findings were also reported by Archam Pong, E.Q.(1976) [39].

Pulse rate and Blood Pressure:

Bradycardia relative to the height of fever is due to typhoid fever. With perforation there is tachycardia. The pulse rate was more than 100 in 26.2% of cases in our study.

Pyrexia:

About 97.4% patients in our series showed temperature of 100.1F or more. Pyrexia is because of toxaemia and peritonitis.

Pneumoperitoneum:

Free air under the diaphragm was present in 85% cases in this study in enteric perforations. Mock, C 1992 [42] reported 52.3%.

Widal Test:

The serologic diagnosis is less reliable for diagnosis. Most, but not all, patients will develop agglutinating antibodies to O, H & Vi antigen. widal test with four fold rise in agglutinins against somatic 'o' antigen in paired sera taken at intervals during illness suggests the diagnosis, but is of little use in acutely ill patients and may be blunted by early effective antibiotics. Earlier the baseline sample is taken, the more likely a significant rise will be detected. They start rising in the second week of illness.

In this series widal test was positive in 96% cases.

Table shows the positive widal test in typhoid perforations.

AUTHOR	YEAR	POSITIVE WIDAL TEST%
Singh & Singh[41]	1975	100.0
Present Study	2019	96%

Blood culture & Stool Culture:

The recovery of the organism from the blood is highest only in the first week of illness and later on it progressively decreases. Blood culture for S. Typhi is positive in only 3% to 34% cases of typhoid perforation (Mock C.N. 1992[42]).

Bacteriology of peritoneal fluid:

Majority of other authors also reported as found in this study that the bacteriological examination of the peritoneal fluid yielded E.Coli in majority of cases. (Singh & Singh, 1975[41]). In majority of cases the organisms were sensitive to gentamycin, Ciprofloxacin, Cloxacillin, Chloramphenicol and Ampicillin. Similar findings were reported by other workers viz Dickson & Cole, 1964[34].

Management:

Two opposing modes of treatment have been advocated for the management of enteric perforation-conservative and operative. There have been strong advocates of conservative therapy in the past (Huckstep, 1962[43]; Woodward, 1964[44]). Huckstep [43] proposed

management of typhoid perforation on the lines similar to ochsner sherren regimen for appendicular lump. His reasoning for advocating such non operative means is as follows:

1) The distal ileum in typhoid fever is like a wet blotting paper at many places and is liable to perforate at more than one spot at any moment.
2) The repair of such a friable gut is impossible and attempts to suture result in further tears.
3) Perforation is low grade and virtually sterile after chloramphenicol therapy and on account of diffuse inflammation of the wall of the gut, adjacent loops become adherent, localising the disease.
4) The mortality of operative treatment is extremely high and those who survive have a stormy Post operative period. In their view surgery for enteric perforation in a typhoid patient who is in a state of toxaemia is associated with a staggering modality of 80% to 100% (Wilcocks and Manson Bahr, 1972[45]).

But in our study we found following objections against the rationale of conservative management.-

1. Although the ileum is oedematous and friable, if handled gently, the suture's do hold.

2. With adequate gastro intestinal suction and antibiotics further perforation is unlikely.

3. Evacuation of pus from the peritoneal cavity lessens the toxaemia and enhances the recovery of the patient. The patient is ill to tolerate surgery but is much more ill to fight continuing toxaemia from the presence of pus in the peritoneal cavity.

4. Surgical closure eliminates the continuous contamination of the peritoneal cavity.

5. There is no suggestion of localisation of inflammation, the perforation is usually not sealed by omentum and peritonitis is almost always generalised. This finding is also observed by wofford et al, 1960[46], and Singh & Singh (1975) [41].

At present surgery has been accepted the standard treatment for this condition by many workers (Eggleston, F.C. 1972[47]; Kaul, B.K., 1975[48]; Dickson & Cole, 1964[34]). Although in a recent review of 344 cases Chauhan & Pande (1982) [40] have reported an improvement in the results of conservative treatment, but they have also conceded that the results are not yet comparable to those of surgery.

On the other hand with the exception of Huckstep's series [43], mortality after conservative treatment is almost 100% (Archampong, 1976) [39].

Operative Findings:

The standard operative management consists of simple closure of perforation. Abdomen was opened in midline which is the incision of choice in emergency.

Amount of Peritoneal Contamination:

Amount of peritoneal contamination was more than 800cc in 36% cases. This was purulent. There was no sign suggestive of spontaneous sealing of perforation. No adhesion formation was seen between the loops of gut and the parietal peritoneum or greater omentum. Similar findings were also reported by Singh & Singh (1975)[41].

Number of Perforations:

Perforation was single in 68.3 % cases and in rest of cases the number was two or more.

However Singh & Singh (1975) [41] reported single perforation in all the cases. Mock, C.N.(1992) [42] reported single perforation in 78.5% cases.

Size of Perforation:

The size of perforation varied from 0.3 to 2.5 cm in diameter the average being 1.5 cm. similar findings were reported by Singh & Singh, 1975[41].

Site of Perforation:

In about 84.21% cases the perforation was present within 6" of ileocaecal region in the terminal ileum and in 10.5% cases within 12" of ileocaecal region and in 5.27% cases it was present about 48" away

from ileocaecal valve. Singh & Singh (1975) [41] reported that all the perforations were within last 12'' of the terminal ileum.

Surgical Procedure:

In all the cases perforation was closed with atraumatic needle in two layers (with silk) after taking a piece from perforation for histopathology except in 8 cases where resection and anastomosis was done because of more than one perforations and poor condition of ileum. Peritoneal cavity was drained in all the cases.

Apart from the simple closure following alternative operations are available to a surgeon:

1. Resection of most affected part with end to end anastomosis (Chamber, 1972[49]) or ileo-transverse anastomosis.

2.Wedge excision of affected segment.

In this study no patient developed post operative leakage or fistula.

Careful and gentle handling of the inflamed intestines further reduced the operative trauma and ensured a leak proof closure.

Post operative Treatment:

Post operative treatment was on the usual lines with continuous nasogastric suction & i.v fluids. Repeated blood transfusions were employed whenever required. Estimation of electrolytes and correction of any abnormality was done in post operative period.

The aim of antibiotic therapy in the post operative period was two fold.

1. To control the typhoid pathology.
2. To control the anaerobic infection.

To control the typhoid pathology ciprofloxacin, ceftriaxone or ampicillin was used Anaerobic infection was controlled by use of metronidazole.

In relation to anaerobic peritonitis, the following facts may be mentioned

a) Anaerobic organisms such as B. Fragilis, B.melaninogenious etc are isolated from the peritoneal fluid in patients with ileal perforation and administration of metronidazole has greatly reduced the mortality in such cases and dramatically brought down the incidence of ineffective complications following surgery.

b) Non traumatic ileal perforations from other causes showed a similar course and high mortality.
c) Salmonella organisms are only occasionally isolated from the peritoneal fluid in these patients (Eustache, 1983) [50].

Biopsy from the edge of perforation:

Biopsy from the edge of perforation showed typical typhoid pathology. There is predominantly macrophage reaction characterised by mononuclear plasma cells and lymphocytes. However, polymorphs were present in a few patients.

Perforation Operation Interval:

The toxaemia of enteric perforation is known to increase with the passage of time till the toxic peritoneal contents are drained. Thus longer the perforation operation interval, greater the toxaemia and higher the mortality. We found that mortality rate increased as the perforation operation interval increased and the mortality was 100% after 72 hrs.

Lesser the perforation - operation interval better are chances of survival. This concept was also observed by Singh &Singh,1975.[41]

There is early return of peristaltic sounds if the perforation operation interval is less.

Factors affecting mortality and morbidity:

Early diagnosis, better understanding of surgical pathology, fluid and electrolyte balance, advances in anaesthesia and antibiotic therapy, early surgical Intervention are some of the factors which were responsible for low mortality in our series. The major cause of death in early post operative period was toxaemia and late morbidity was from wound complications

Dickson & Cole (1964) [34] reported toxaemia as the major cause of death followed by reperforation, subphrenic abscess, burst abdomen and cardiac arrest at operation.

Post Operative Complications:-

Wound Infection:

Wound infection is reported as the major post operative complication in typhoid ideal perforations by many workers. Its Incidence was reported

52.9% by Archampong (1976).[39] In this study the incidence of wound infection was 21%.

Toxaemia:

Toxaemia results from absorption of the lipopoly sachharide endotoxin of typhoid from the inflamed peritoneum & leads to septic shock and multiple organ system failure which include cardiac and circulatory dysfunction followed by impairment of the pulmonary and renal system and then metabolic and hepatic failure. Toxaemia was there in post operative period in 5.2% cases in this study.

Hyperpyrexia: The cause of post operative fever are post operative infections which follow contamination at the time of operation, at the operation site itself, via the airway during general anaesthesia or from cannulas and catheters inserted in the operating room. In this study hyperpyrexia was there in 12.9% cases.

Partial wound dehiscence& burst abdomen:

Severe anaemia, malnutrition, diabetes, corticosteroids, obesity, heavy Coughing and accumulation of ascites predispose to wound failure.

In this study burst abdomen was there in 2.4% cases. The incidence of burst abdomen was reported 5.2% by Dickson & Cole(1964) [34]

Respiratory Complications:

Pneumonic consolidation and severe chest infections were encountered in 11.8% cases in this study, however acute respiratory failure was not seen in any case. Incidence of post operative chest complications varied from 4% to 20.5% as reported by various workers viz Archampong. 1976.[39]

Other Miscellaneous Complications:

Other complications reported to literature are Uraemia, toxic delirium, decubitus ulcer, thrombophlebitis, osteomyelitis, parotitis, transfusion reaction, severe anaemia and cardiac arrest by Archampong, 1976.[39] The complications like post operative aspirataion and collapse, decubitus ulcer and parotitis can be prevented by improved nursing care. These complications were not seen in this study.

PEPTIC ULCER PERFORATIONS

The 2nd common cause in this study of gastrointestinal perforations was peptic ulcer perforation including duodenal 11, gastric 5 and pylorus 4. It accounted for total 20 out of 85 cases (23.52%).

Generally peptic ulcers situated on anterior wall or curvature perforate whereas those located posteriorly penetrate into the surrounding structures.

Dandapat M.C. et at (1991) [29] reported that amongst the gastro intestinal perforations, the commonest was peptic ulcer perforation which accounted for 79.4% of all the perforations of gastro intestinal tract.

In our study the M : F ratio was 3 : 1 Dandapat, et al (1991) [29] reported M:F ratio of 8.4 : 1.

R. Heuman et al (1983) [36] noted 87% of the patients were smokers at the time of duodenal ulcer perforation. In this study 55.55% cases were smokers & 44.4% were alcoholics. All the cases were consuming spices & chillies in there diet with lesser quantity of milk.

Abrupt cessation of the H2 receptor antagonists has been reported to result in perforation in few patients of peptic ulcer (Wallace, 1977[51]; Keighley, 1977[52]). This is possibly due to acid rebound and these partly healed ulcers with H2 receptor antagonists may be less resistant to Perforations when exposed to even normal acid concentration after withdrawal of drug. None of our Patients was on regular H2 receptor antagonist drugs.

Clinical features:

Escaping of air provokes a sudden agonising pain in the epigastrium associated with vomiting & nausea. The face is pale & the patients are anxious with profuse sweating. The temperature is often subnormal.

A significant percentage of patients had laboratory evidence of anaemia in various studies. The presence of anaemia had a grave effect upon the outcome of a perforation. A larger percentage of patients showed laboratory evidence of haemoconcentration than anaemia.

Radiological diagnosis:-

One of the most reliable diagnostic procedures in acute perforated duodenal ulcer is x-ray demonstration of pneumoperitoneum in erect or lateral decubitus position. The degree & amount of pneumoperitoneum is dependent upon the amount of air swallowed, site of perforation & duration of perforation.

In this study pneumoperitoneum was demonstrated in 100% cases.

Peritoneal fluid culture:

In this study E coli was cultured from peritoneal fluid in 55.5% cases, Klebsiella in 22.2% cases, Staphylococcus in 10.5% cases & Streptococcus faecalis in 10.5% cases.

Management:-

Non operative management:

The idea of conservative approach comes from the operative findings seen in a few cases of duodenal ulcer perforation where the perforation was found to be sealed off by an omental plug or adjacent viscus. Hence it was felt that if such patients are kept on empty stomach by nasogastric aspirations and fluid and nutrition's are maintained under cover of antibiotics, it is expected that these Patients Will be benefited.

Operative management:

Depending upon the mode of presentation, time interval that has lapsed after perforation and general condition of the patient, the following methods of treatment are generally advocated.

1) Simple Closure

2) Definitive Treatment

1) **Simple Closure:**

Omental patch is a simple, effective, less time consuming, safe and does not require special surgical expertise nor does it subject the patient to prolonged anaesthesia (Booth & Williams, 1971) [53]. In this study closure of perforation with omental patch was done in all the cases.

2) Definitive Treatment:

In view of poor long term results following conservative treatment of simple closure of perforated duodenal ulcer, trend has been changing towards immediate definitive treatment.

The procedures which are used currently are

1) Closure of perforation, Vagotomy and drainage procedure.

2) Partial Gastrectomy.

3) Closure and parietal cell vagotomy.

It has been suggested that definitive procedure be limited to younger patients with history of chronic duodenal ulcer and patients with obstruction or haemorrhage.

Booth and Williams (1971) [53] also have stated that policy of emergency definitive treatment must necessitate for greater participation by consultants. Dandapat, M.C. (1991) [29] observed that patients undergoing definitive surgery had no post operative morbidity & mortality.

Prognosis:-

Mortality & morbidity in peptic ulcer perforation has been brought down significantly in recent years with better understanding of its diagnosis, appropriate early treatment, after effective resuscitation & various other important factors influencing its outcome.

The positive correlation between shock on admission, degree of peritonitis & mortality has been emphasised by Hardy et al (1961) [54]. They further observed that mortality in these patients normally preceded by onset of organ system failure, when oligaemic shock & septicaemia seems to add insult to the damage caused by organ system failure.

Morbidity:-

Wound infection & partial dehiscence was seen in 11.8% of cases in this study. Wound infection is described as common post operative complication seen in these cases.

Respiratory complications often occur in the form of bronchopneumonia, lobar pneumonia & atelectasis which constitute the dominant cause of respiratory failure particularly seen after 5th to

10th post operative day. Smoking seems to predispose these patients to higher incidence of post Operative chest complications (R.Heuman et al, 1983).[36]

TRAUMATIC PERFORATIONS

The third common cause of gastro intestinal perforation in this study was trauma (10.6%). The incidence of abdominal trauma continues to increase. The intestine is the third most commonly injured organ in blunt abdominal trauma after spleen & liver, Davis J.J., 1976 [55], the incidence varying from 5-15% among the patients with blunt abdominal trauma. The colon is largely protected from nonpenetrating injuries by the bony thorax & pelvis.

Duodenal injuries can occur because of penetrating or blunt trauma. The first part of the duodenum is relatively mobile so blunt trauma results in traction tears. The second part is fixed & injury to it is caused by the closed loop bursting between the pylorus & the duodenal jejunal flexure which is fixed by ligament of treitz. The 3rd & 4th part are injured due to the shearing against the spine. Associated injuries to the surrounding viscera viz liver, right kidney, pancreas & inferior vena cave are common but in this study only 1 perforation in duodenum was seen due to trauma. Traumatic non duodenal perforation of the small bowel most commonly involve the proximal jejunum, distal ileum which are relatively fixed in position.

History & physical examination remained the most reliable diagnostic modalities. The entire Patient must be examined as Well as the abdomen because of the high incidence of associated trauma. A high index of suspicion is Must even in cases of supposedly minor abdominal trauma because relatively trivial injuries may rupture abdominal viscera.

Abdominal pain, tenderness, rigidity & guarding are reliable findings. Needle abdominal peracentesis is a useful diagnostic aid for cases of abdominal trauma in which, after physical examination there is suspicion of intra abdominal haemorrhage.

The role of diagnostic peritoneal lavage was recommended by (Dupriest, R.W., 1982[56]) They stressed that detection of blood, food

particles or large number of WBC on gram's stain were absolute indications for operation.

The reasons for the absence of pneumoperitoneurn in the some cases are that the:

1) lacerations of the lower small bowel are covered by surroundings loops quickly and efficiently.
2) The Perforation may be there in the segment of the bowel already collapsed.
3) slit like Perforations of the to gut seal off quickly so that the accumulation of extraluminal gas is not detected.
4) there may be small retroperitoneal duodenal rupture.

The various causes of shock in traumatic perforation of the gut are hypovolemic shock due to Injury to liver, spleen, mesenteric vessels and inferior vena cave, haemothorax due to chest injuries, traumatic neurogenic shock, shock due to pancreatico duodenal injury; endotoxic shock due to large gut perforation owing to high virulence of the organisms in the colon.

In the management of penetrating injury to duodenum, it is important to rule out injury to the posterior wall of the duodenum either by direct inspection through the tear or by Kocherisation of the duodenum. Simple cuts and lacerations are managed by suturing in two layers with non absorbable suture material. For blunt injuries which are not extensive, suture closure of the tear with a gastrostomy tube across the tear to decompress the duodenum can be done (Stone H.H. 1979) [57].

Small, single perforations of the small bowel may be closed safely with a single layer of interrupted non-absorbable mattress sutures that include and invert seromuscular and submucosal coats of the bowel Perforation of lacerations to the mesenteric border, unless they are quite small, are treated by transaction and reanastomosis.

Metronidazole was given to all the patients to combat anaerobic infections post operatively. Other workers also recommend its use (Wills et al 1977[58]; Whelan et al 1973[59]). Early exploration gave good results. In this study no mortality was there in traumatic perforations.

Delay in diagnosis of over 24 hours results in a significant increase in morbidity.

The various complications reported in literature are intra peritoneal abscess, pelvic abscess, sepsis, wound infections, dehiscence of the wound, duodenal fistulae, rectal fistula, rectovesical fistulae, leakage from anastomotic site, upper gastro intestinal haemorrhage, stress ulcer, peristomal abscess, meningitis, osteomyelitis, urinary tract infection, adult respiratory distress syndrome and pneumonia, short bowel syndrome, fascitis and associated complications of colostomy. But in this study there were only minor wound infection and respiratory infections because of early surgical intervention there was minimum soiling of the peritoneal cavity.

APPENDICULAR PERFORATIONS

The M : F ratio in our series was 6:1. In this study total leucocyte count was more than 10000 in 66.66% and less than 10000 in 33.33%patients in appendicular perforations..

The fourth common cause of gastro-intestinal perforation in this study was appendicular perforations (8.2%).

Pneumoperitoneum is rare in perforated appendicitis because perforation in appendicitis is generally from the obstructed segment and hence the gas cannot escape from ileocaecal region because of obstruction. If perforation is insidious, the inflammatory adhesions develop between the loops of bowel, peritoneum and omentum and wall of perforation area leading to only localized peritonitis and periappendiceal abscess.

In this study also, no free-air was detected in any case, under the right dome of the diaphragm on plain X-ray of abdomen in erect posture.

A perforation or abscess in the right lower quadrant results in an appearance of paralytic ileus. In general a mottled appearance in the right lower quadrant, a mass displacing the caecum or gas believed to be outside bowel should raise the suspicion of an abscess. Peritoneal irritation can result in different areas of bowel being dilated & collapsed. Some of these patients will have a dilated caecum with a gas fluid level with in, secondary to localised adynarnic ileus.

The bacterial flora found in perforated appendix is a mixed colonic flora with both aerobic organisms. The organism cultured in this study was E.Coli in 100% cases. Greenall, M.J. (1978) [32] also reported E.coli in 48% cases and bacteroides species in 12% cases. Other author like Stewart, D.J. (1978) [60] reported similar findings. Metronidazole was given to all the patients and response was excellent as also reported by Whelan and Hale in 1973[59] and Greenall, M.J. in 1978. [32]

Greenall, M.J. (1978) [32] advocated that there was no added advantage of intraperitoneal drain in patients undergoing appendicectomy for perforated appendicitis. In this study appendicectomy was done with drainage.2 patient expired in our study. The mortality is less 2.3% in our study. This was because of early diagnosis, early surgical intervention, better understanding of fluid and electrolyte balance and combination of antibiotics including metronidiazole to cover anaerobes. The mortality reported was 3.8% by Greenall M.J. (1978).[32] They reported generalised spesis as the major cause of death from peritonitis, intra abdominal or gram negative septicaemia.

Post operative complications occur in 70% patients of appendicular perforations in this study.

Infection of the subcutaneous tissue is the most common complication (Greenall, M.J. 1978[32]). E.Coli and Bacteriods were the most common organism recovered. Faecal wound infection induces the necrosis of subcutaneous fat leading to pus formation. In this study wound infection occur in 1 patient only.

Pelvic, subphrenic or intra-abdominal abscess occur in up to 20% of patients with gangrenous or perforated appendicitis. Abscess usually are due to pre-operative contamination of the Peritoneal cavity by organisms leaking from perforated appendix. In this study no abscess occurred.

Other complications reported are faecal fistulae, pylephlebitis, intestinal obstruction, chest complications, burst abdomen and urinary tract infections etc.

TUBERCULAR PERFORATION

Tubercular perforations accounted for 5.9% of gastro intestinal perforations seen in this study.

The incidence of tubercular perforation was reported 0.5% by Dandapat, M.C.(1991) [29].

Pain, the commonest presenting symptom is not always sudden nor severe, so that patients do not seek medical advice immediately.

Distension of abdomen is present in majority of patients due to peritonitis, obstruction, toxaemia and disturbances in serum biochemistry etc.

The tendency to adhesion formation in tuberculous process and the associated plastic peritonitis would be a strong argument for conservatism. However the associated strictures and the presence of obstruction offset these advantages. Thus surgery is a more rational treatment. In most of the cases the perforation is present proximal to an impassable structure, the perforation is the best expedient except in the rare instance where Peritoneal soilage is minimal and disease localised, when resection may be resorted to. A supplementary bypass anastomosis is fashioned if intestinal obstruction is present or impending.

The biopsy showed aggregation of epitheloid cells and multinucleate giant cells forming tubercles. Histologically proved tuberculous lymphadenitis with caseation is an infallible evidence of the diagnosis. Presence of peritoneal tubercles is very significant, as these are not observed in crohn's disease which simulates tuberculosis macroscopically.

MALIGNANT PERFORATIONS

Perforation due to malignancy of bowel accounted for 3.5% of the cases in the present study.

Early recognition, resuscitation and surgery are the main measure of management of such cases. However if the perforation lies remote from the growth, then exteriorization of the perforation is at or close to the growth, then either primary resection with or without faecal diversion or suturing of perforation with proximal diversion, has to be

undertaken. The consensus of opinion regarding the surgical option is, that primary resection in such cases at the initial laparotomy may be less hazardous than more conservative measures.

In present study there was no mortality.

NONSPECIFIC PERFORATIONS

Non specific Perforation were there in 11.8% cases in this study. They were diagnosed only after the histopathology report.

Non specific enteritis can be defined as an acute patchy necrotising lesion mainly affecting the jejunum. This is an entity which is differentiated from enterocolitis of infancy, Ischaemic enteritis of old age and ischaemic necrosis of the mesenteric vessels are patent in this case.

The hypothesis put forward by Lawrence and Walker (1976) [38] seems to be most logical. They felt that prolonged malnutrition and protein deficiency are responsible for the disease. These factors reduce pancreatic and other digestive proteins and also some other factor in diet containing heat resistant trypsin inhibitors. If such an individual is exposed to contaminated food, there is failure of proteolysis of organisms and their toxins. Then whole brunt of attack falls on jejunum. In this study ileum was involved.

In this study most important symptoms were abdominal pain & distension. These findings are in agreement with those of others (Gupta S.D., 1977[37]; Lawrence and Walker, 1976) [38].

The widal test was negative in all these cases and biopsy report showed non specific Inflammation.

The surgical treatment recommended for nonperforations was resection and end anastormosis. In this study also similar procedure was adopted.

Overall mortality reported in literature varies from 14% to 48% (Gupta, S.D. 1977[37]). In this study 2 cases of non specific perforation was there who died.

DIVERTICULAR PERFORATIONS

Perforation due to diverticular disease was seen in 7.1% cases in present study.

Diverticulitis of jejunum and ileum are uncommon. Asymptomatic diverticula of the small intestine are occasionally noted on barium meal study or small bowel examination. In a prospective study of 1200 routine small bowel examinations, Parulekar (1972) [13] found 15 cases of acquired diverticula and out of these 8 patients had perforation. Parulekar, 1972[13] reported that majority of these patients presented in an acute abdominal condition which resembled acute appendicitis or appendiceal abscess.

Local resection and end to end anastomosis is the recommended treatment for diverticular Perforations. In this study resection and end to end anastomosis was done.

CLINICAL FEATURES:

Pain abdomen, Vomiting, Distension and Fever were the predominant symptoms in our study. Pain abdomen was seen in all cases. Thammegowda Kemparaj et al(2016) [4] also reported pain abdomen in 100% cases in their study.In peptic ulcer perforation patients had history of pain in the upper abdomen in majority of the cases. NSAID drugs consumption were positive among 15% of the peptic ulcer perforation cases, similar findings were seen in study by Rajender S Jhobta (2006) [1] – (13% of cases).

Rajender S Jhobta [1] (2006) reported vomiting in 60% and abdominal distension in 68% in small bowel perforation. Thammegowda Kemparaj et al(2016) [4] reported vomiting in 80% case. Our study also reported about 62% cases with vomiting and 60% cases with distension of the abdomen.

Rajender S Jhobta [1] (2006) reported vomiting in 66% and fever in 43% cases of appendicular perforation. Our study reported about 65% cases of vomiting and 22% cases of fever. Similar findings were reported in other studies such as Dandapat[29] and colleagues.

Tachycardia was commonly seen in cases who presented with small intestine and appendicular perforation due to third space loss. In our study tachycardia was noted in 72% of the cases.

On examination tenderness was recorded in all the cases. Distension was noted in 72 cases, Guarding/Rigidity in 50 cases. Obliteration of

liver dullness was noted in 32 cases and bowel sounds were absent in 44 cases. Distension and absence of bowel sounds were not found in majority of appendicular perforation due to early localization of the peritonitis.

INVESTIGATIONS

Presence of gas under the diaphragm has been a trademark of hollow viscus perforation but absence of this does not exclude the possibility of the perforation. This sign is visualized in about 94.1% of the cases in our study.

Rajandeep Singh Bali, Sushant Verma 2014[6] also have quoted pneumoperitoneum in 79% percent of cases.

Thammegowda Kemparaj et al(2016)[4] also reported pneumoperitoneum in 75% percent of cases.

Laxmi Narayan Meena, Sanchit Jain et al 2017 [61] have quoted pneumoperitoneum in 86.2% percent of cases which is similar to results of our study.

Similar results are present in our study, pneumoperitoneum in 94.1%% percent of cases.

N. William and N.W Everson (1997) [12] have quoted “In 60 to 70 percent of cases the free gas under diaphragm can be detected”. M.C. Dandapat and colleagues (1991) [29] noticed gas under the diaphragm in 72.35%. Our study co-related well with the above mentioned study. Only one in seven cases of appendicular perforation had gas under the diaphragm. This may be due to confinement of the perforation.

Ultra sound abdomen is readily available, non invasive investigations but it gives only indirect evidence of perforation through presence of free fluid with echogenicity suggestive of perforation. In our study we found free fluid in most of the cases of perforation.

Widal test was positive in 39(46%) cases in our study. M.K Chauhan and S.K Pande (1982) [40] in 70%.

TREATMENT

ETIOLOGY	OPERATIVE PROCEDURE	NO OF CASES
ENTERIC PERFORATION	3 SIMPLE CLOSURE+DRAINAGE 4 RESECTION+END TO END ANASTOMOSIS	22 8
TUBERCULAR PERFORATION	3 SIMPLE CLOSURE+DRAINAGE 4 RESECTION+END TO END ANASTOMOSIS	2 3
PEPTIC PERFORATION	1 SIMPLE CLOSURE +OMENTOPLASTY	20
TRAUMATIC PERFORATION	3 SIMPLE CLOSURE+DRAINAGE 4 SIMPLE CLOSURE+TRANSVERSE COLOSTOMY	4 5
APPENDICULAR PERFORATION	APPENDECTOMY +DRAINAGE	7
MALIGNANT PERFORATION	RESECTION +END COLOSTOMY WITH HARTMAN"S PROCEDURE	3
DIVERTICULAR PERFORATION	RESECTION+ END TO END ANASTOMOSIS	6

Out of 30 cases of enteric perforation 22 cases was closed with atraumatic needle in two layers (first layer with catgut and second layer with silk) after taking a piece from perforation for histopathology except in 8 cases where resection and anastonosis was done because of more than one perforations and poor condition of ileum. peritoneal cavity was drained in all the cases.

M.N Noorani (1997) [62] have reported the operation of choice as simple closure of perforation in 2 layers.

Out of 20 cases (11 dudenal, 5 gastric and 4 pyloric) of peptic perforations 15 were duodenal (including pylorus) and 5 cases were gastric perforation ie 3:1 ratio noted. Our study is similar to the studies from United Kingdom and United States (4:1). Simple closure of the

perforation was performed with omental patch in all the cases. None of the cases were taken for definitive surgery. World wide literatures are in agreement with the same. In all the gastric perforation cases, biopsy of the edge was taken and confirmed to be benign.

For all cases of appendicular perforation, appendicectomy was done and most of the literatures suggest the same.

Local resection and end to end anastomosis is the recommended treatment for diverticular Perforations. In this study resection and end to end anastomosis was done.

POST OPERATIVE COMPLICATIONS:

Forty five percent of patients developed post operative complications in our study, out of which wound sepsis was seen in 10% of cases. M.C Dandapat (1991) [29] reported wound sepsis in 13.5% of the cases and Rajender. S. Jhobta (2006) [1] reported wound sepsis in 25% of the cases.

Uday singh beniwal et al 2003 [7] reported Common postoperative complications included wound infection (23%). In our study most common complication is wound infection.

Many patients had chest infections (12%). It was more common in older patients. Septicemia was seen in 12.9% of patients whereas Rajender S Jhobta et al (2006) [1] reported septicemia of 18% in his study.

A Bhaskar et al, 2020 [22] reported Wound infection was most commonest complication (10%) seen in the post-operative period. In general complications, septicemia (12%) was the most common. Our study reported wound infection in 9.4% and septicemia in 12.9% patient as post operative complications which showed similar results.

Mortality:

Our study reported mortality of 16.5%. the cause of death was mainly due to septicemia. rajender s jhobta et al (2006) [1] reported moratlity of 10% in his study.

Laxmi Narayan Meena, Sanchit Jain et al 2017[61] reported morbitity and mortality 42.8 % AND 14.7%. Our study also reported similar findings i.e morbidity 44.1% and mortality 16.5%.

Uday singh beniwal et al 2003[7]The overall mortality 10.5% respectively.

Rumi shin et al 2016 also mortality rate was 13% in their study.[18]

Quereshi et al (2005) [63] reported mortality 15%, Nishida et al(2002) [64] reported mortality 13.1% and Dandpat et al(1991) **[29]** reported 15.9% in their study. Results are in these study are similar to our study. The mortality is less 2.3% in our study in appendicular perforations. This was because of early diagnosis, early surgical intervention, better understanding of fluid and electrolyte balance and combination of antibiotics including metronidiazole to cover anaerobes. The mortality reported was 3.8% Greenall M.J. (1978) [32]. They reported generalised spesis as the major cause of death from peritonitis, intra abdominal or gram negative septicaemia.

Andreas Hecker, et al 2015[2] reported 80 % patients of the early intervention group had an improved overall survival (vs. 73 % in the late intervention group) in his study. Similar findings are present in our study i.e early intervention with short admission operation interval had improved survival shown by our study.

A Bhaskar et al, 2020[22], Mortality rate was (12%) in this study with septicemia and multi organ failure being the commonest cause of mortality. Mortality was clearly more in patients who presented more than 24 hours duration after the onset of symptoms. Similar results are present in our study as mortality mortality 16.5% and septicemia is common cause of mortality.

SUMMARY & CONCLUSIONS

1. In this study, 85 cases of gastro intestinal perforations admitted in the Surgery department of Dayanand Medical College & Hospital, Ludhiana (Punjab) were studied.
2. Enteric perforations were found to be the commonest cause of gastro intestinal perforations which accounted for 35.3% of total. This was followed by duodenal perforations and nonspecific 11.8% both, traumatic perforations 10.6%, appendicular perforations 8.2%, diverticular perforations 7.1%, pyloric ulcer 4.7%, malignant 3.5% and mucormycosis 1.2%.
3. Not even a single case of amoebic perforation was seen in this study.
4. Typhoid fever is a major disease in poor country which have not yet attained high public health standards. Perforation usually take place in 2^{nd} - 3^{rd}week of the illness with gradual history of prolonged and continuous fever followed by severe pain in abdomen, were the most important features in diagnosis.
5. Widal test was positive in 96% cases of typhoid perforation but free air under the right dome of diaphragm was present in 90% of cases of typhoid perforations.
6. Surgery was the standard treatment for typhoid perforation. Typical operative findings i.e. single, oval perforation on the antimesenteric border in the terminal ileum gave further clue to the diagnosis.
7. The basic concept was the simultaneous dual attack on the typhoid pathology with ciproflaxacin and metronidazole and ceftriaxone.
8. Laparotomy with simple closure of the perforation in two layers (first layer with catgut and second layer with silk) was the surgical procedure of choice in typhoid perforations.
9. The mortality rate in typhoid perforations was 15.7% & wound infection was the common post operative complication.

10. Morbidity & mortality increased with the increase in perforation operation interval.
11. Early exploration, blood transfusions, maintenance of fluids & electrolytes and combination antibiotics decreased the mortality.
12. A high mortality from typhoid toxaemia appeared to be inevitable and this disease can only be realistically tackled by public health measures.
13. Tubercular perforation was suspected in those cases where there was previous history of subacute attacks of intestinal obstruction and coexistent chest lesion. Surgery was the treatment of choice. Suturing of perforation should be supplemented by enteroanastomosis to bypass a manifest or impending obstruction.
14. Simple closure of the peptic ulcer perforation with omental patch was the surgical treatment opted in this study. Definitive surgery like pyloroplasty and truncal vagotomy should be performed by only a surgeon experienced in this field. Mortality& morbidity was decreased with early surgical intervention.
15. History of trauma and clinical findings were important in making the diagnosis in the absence of pneumoperitoneum in blunt injury cases. A high index of suspicion is must for early diagnosis to reduce morbidity & mortality associated with such injuries.
16. Mortality & septic complications after surgery for duodenal and peptic perforation were nil due to early surgical intervention & better post operative management.
17. There was no mortality in perforation due to malignancy in this case.
18. Non specific perforation were diagnosed only after the histopathological report.
19. Diverticular perforation of the small intestine was less and mucormycosis was rare.
20. E. Coli was cultured from the peritoneal fluid in 41.2% cases. Other organisms were Klebsiella, Staphylococcus,

Streptococcus faecails, proteus, enterobacter and pseudomonas, mucormycosis. Organisms were sensitive to ciproflaxacin in 80% cases, ceftriaxone in 86% cases, cefotaxime in 60% cases, carbapenem 82%, and piperacillin 75% cases.

21. Metronidazole was given to all the patients to combat anaerobic infection.
22. Biopsy from the edge of the perforation was studied histopathologically. There was characteristic mononuclear cell infiltration along with macrophages in all cases of enteric perforations. Aggregation of epitheloid cells with multinucleate giant cells confirm thepathology of tubercular perforations. There were acute not specific inflammatory cells in non specific perforations. The cells exhibiting moderate nuclear pleomorphism having vesicular nuclei, prominent nucleoli and moderate amount of cytoplasm suggestive of malignancy. There is aseptate, broad hyphae suggestive of mucormycosis seen on GMS stain and PAS stain.
23. The overall mortality was 16.5%% in this study and complications were wound infection, hyperpyrexia, respiratory complications, partial wound dehiscence, burst abdomen, urinary infections and aggravation of toxaemia.

CONCLUSION:

From this study it is concluded that good resuscitation, early and energetic surgical Intervention, thorough peritoneal toileting with normal saline, blood transfusion, maintenance of fluid & electrolytes balance, improved anaesthesia, combination antibiotics, including metronidazole are the factors which reduce the morbidity and mortality of gastro intestinal perforations.

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PROFORMA

SERIAL NO. CASE**:** C.R. NO.**:**

NAME**:** SEX**:**

AGE**:**

ADDRESS**:**

DATE OF ADMISSION**:**

DATE OF OPERATION**:**

DATE OF DISCHARGE**:**

COMPLETE CLINICAL HISTORY**:**

(A) PRESENT HISTORY**:**

(B) PAST HISTORY**:**

(C) PERSONAL HISTORY**:**

SMOKING**:**

ALCOHOLISM**:**

FOOD HABITS**:**

SPICES**:**

CHILLIES**:**

MILK**:**

VEGETARIAN/NON- VEGETARIAN**:**

HOME MADE/DHABA/ HOTEL ETC**:**

Signature of Candidate **Signature of Supervisor**

COMPLETE PHYSICAL EXAMINATION:

GENERAL CONDITION:

PULSE RATE: TEMPERATURE:

BLOOD PRESSURE: RESPIRATORY RATE:

ANEMIA: CLUBBING:

CYANOSIS: OEDEMA FEET:

JAUNDICE: LYMPHADENOPATHY:

CHEST EXAMINATION:

C.V.S. EXAMINATION:

PRE-ABDOMEN EXAMINATION:

- ABDOMINAL DISTENSION
- RIGIDITY/ GUARDING
- ABSENT LIVER DULLNESS
- ABSENT BOWEL SOUNDS
- FREE FLUID IN THE PERITONEUM
- PERITONEAL TAPPING

PROVISIONAL DIAGNOSIS:

ROUTINE INVESTIGATION:

HB: PT/INR: TLC: DLC:

PLATELETS: HEMATOCRIT:

B.UREA: SR.CREAT: B.SUGAR: S.ELECTROLYTES

T.BILIRUBIN: D.BILIRUBIN: URINE ROUTINE

Signature of Candidate **Signature of Supervisor**

SPECIAL INVESTIGATIONS

- CHEST X RAY (P/A view)
- PLAIN X-RAY OF ABDOMEN IN ERECT POSTURE
- WIDAL TEST

OTHER INVESTIGATIONS**:**

- USG ABDOMEN:

- CE CT ABDOMEN

DURATION BETWEEN ADMISSION OF PATIENT AND OPERATION**:**

OPERATIVE FINDINGS**:**

POST-OPERATIVE TREATMENT**:**

BIOPSY REPORT**:**

PERITONEAL FLUID CULTURE & SENSITIVITY REPORT**:**

POST- OPERATIVE COMPLICATIONS**:**

Signature of Candidate **Signature of Supervisor**

Follow up: -

Wound infections	Hyperpyrexi
Respiratory complications	UTI
Burst abdomen	Peristomal skin irritation/infection
Parastomal herniation	Stomal retraction/Prolapse

1st Month

3rd Month

Signature of Candidate **Signature of Supervisor**

Sr. No	Initial Name	Age	Age group	Gender	site	Month	Pulse	Temp. in F	hb	TLC	HB GROUP	TLC GROUP	Widal Test	Air Diaph	etiology	Pertonial Fluid C/S	Urea	Admission Operation Interval	Stay in Hospital (Days)	Complications	Outcome
1	SK	56	5	M	jejunum	November	134	97	8.3	3.1	1	1	Negative	Absent	diverticular	E. coli	45	28	3	HYPERPYREXIA	Expired
2	BS	70	6	M	pylorus	November	100	97.6	12.2	11.2	3	2	Negative	Present	pyloric ulcer	Candida tropicalis	182	15	8	RESPIRATORY	Discharged
3	SJ	45	4	M	ileum	November	118	101	10.7	9.4	2	1	Positive	Present	enteric	Enterococcus Faecium	26	18	10	ABSENT	Discharged
4	HK	50	4	F	ileum	November	120	97	5.3	3.6	1	1	Positive	Present	enteric	E. coli	13	10	5	WOUND INFECTION	Discharged
5	DS	60	5	M	sigmoid	November	120	97.2	11.6	23	2	2	Negative	Present	nonspecific	E. coli	54	19	9	HYPERPYREXIA	Discharged
6	MS	24	2	M	ileum	November	120	96.8	16.2	4.2	3	1	Positive	Present	tubercular	E. coli	29	32	4	ABSENT	Expired
7	JS	75	7	M	duodenum	November	68	97.4	11.1	5.6	2	1	Negative	Present	dudenal ulcer	Candida tropicalis	77	20	14	UTI	Discharged
8	SK	65	6	F	ileum	November	120	101	11.9	8.1	2	1	Positive	Absent	enteric	E. coli	48	22	15	HYPERPYREXIA	Discharged
9	SK	18	1	M	ileum	November	72	97.6	9.4	12.2	1	2	positive	Present	enteric	E. coli	67	17	16	ABSENT	Discharged
10	AK	35	3	F	sigmoid	November	122	100.2	11.8	9	2	1	Negative	Present	traumatic	E. coli	20	14	12	ABSENT	Discharged
11	HK	42	4	F	Rectum	November	80	97.4	6.8	11.8	1	2	Negative	Absent	nonspecific	No Growth	24	34	5	WOUND INFECTION	Expired
12	MR	80	7	M	jejunum	November	88	100	12.8	5.4	3	1	Positive	Present	diverticular	E. coli	76	9	18	RESPIRATORY	Discharged
13	NS	63	6	M	ileum	December	80	97.5	12.1	16	3	2	positive	Present	nonspecific	E. coli	124	19	20	ABSENT	Discharged
14	N	26	2	F	jejunum	December	116	96.8	8.9	7.9	1	1	Positive	Present	enteric	Enterobactem aeuogeus	38	6	17	UTI	Discharged
15	KL	82	7	M	jejunum	December	106	97.8	12	20.7	2	2	Negative	Present	diverticular	E. coli	30	31	2	RESPIRATORY	Expired
16	KS	70	6	M	ileum	December	82	100	10.2	12.1	2	2	Positive	Absent	enteric	No growth	40	18	5	ABSENT	Discharged
17	KP	60	5	M	duodenum	December	120	98.4	13.2	8.4	3	1	Negative	Present	dudenal ulcer	E. coli	62	24	8	HYPERPYREXIA	Discharged
18	V	22	2	M	ileum	December	124	97.6	11.2	4	2	1	Positive	Present	enteric	E. coli	18	16	6	ABSENT	Discharged
19	SR	30	2	M	appendix	December	96	97.4	7.9	8.9	1	1	Negative	Present	appendicular	Enterococcus Faecium	10	5	5	WOUND INFECTION	Discharged
20	M	29	2	F	ileum	December	84	97.6	13	11.1	3	2	Positive	Present	enteric	No growth	14	13	12	ABSENT	Discharged
21	MLG	75	7	M	pylorus	December	80	97.6	12	14	2	2	Negative	Present	pyloric ulcer	E. coli	122	20	11	HYPERPYREXIA	Discharged
22	SL	45	4	M	rectum	January	72	98.4	9.1	11.4	1	2	Negative	Absent	malignant	E. coli	21	22	13	ABSENT	Discharged
23	MK	62	6	F	appendix	January	84	97.4	10.6	13.2	2	2	Negative	Present	appendicular	Klebsielllia	21	16	18	PERISTOMAL SKIN INFECTION	Discharged
24	CK	30	2	F	ileum	January	126	98.2	9.2	9.9	1	1	Positive	Present	enteric	E. coli	28	29	8	ABSENT	Expired
25	RP	70	6	M	appendix	January	76	97	11.6	6.6	2	1	Negative	Present	appendicular	Klebsiella pneumonia	24	21	15	RESPIRATORY	Discharged
26	PK	50	4	F	rectosigmoid	January	106	98.2	13.4	2.1	3	1	Negative	Present	traumatic	No growth	27	14	18	PERISTOMAL SKIN INFECTION	Discharged
27	RK	53	5	M	pylorus	January	96	97.6	13.2	7.6	3	1	Negative	Present	pyloric ulcer	Klebsiella pneumonia	48	7	20	ABSENT	Discharged
28	AK	41	4	M	Ileum	January	98	102	10.1	7.6	2	1	positive	Present	enteric	Enterobactem coccus	48	23	5	UTI	Expired
29	KS	65	6	M	duodenum	January	96	98.4	12.9	12.5	3	2	Negative	Present	traumatic	E. coli	30	27	7	ABSENT	Expired
30	MS	28	2	M	jejunal	February	74	97.6	13.8	8.4	3	1	Positive	Present	traumatic	No growth	72	23	9	HYPERPYREXIA	Discharged
31	DK	85	7	F	pylorus	February	78	97.4	12.4	5.7	3	1	Negative	Present	pyloric ulcer	No growth	146	16	12	PERISTOMAL SKIN INFECTION	Discharged
32	IA	30	2	M	appendix	March	72	96.8	12.7	13.7	3	2	Negative	Present	appendicular	No growth	93	7	5	ABSENT	Discharged
33	BS	45	4	M	jejunum	March	110	97.4	8.8	10.2	1	2	Negative	Present	traumatic	E. coli	53	10	12	RESPIRATORY	Discharged
34	NK	60	5	F	Ileum	March	118	97.4	9.1	14.8	1	2	Positive	Present	enteric	Enterobacter cocci	25	34	8	ABSENT	Expired
35	RKS	52	5	M	duodenum	March	116	96.8	11	6.9	2	1	Negative	Present	dudenal ulcer	No growth	39	4	10	WOUND INFECTION	Discharged
36	SD	65	6	F	ileum	March	96	101	11.1	20.1	2	2	positive	Present	enteric	E. coli	79	6	5	ABSENT	Discharged
37	KR	59	5	M	ileum	March	103	97.2	6.4	6.4	1	1	Positive	Present	enteric	No growth	93	12	14	ABSENT	Discharged
38	KK	40	3	F	ileum	April	102	96.4	9.6	10.9	1	2	positive	Present	enteric	E. coli	19	9	2	HYPERPYREXIA	Discharged
39	GK	85	7	F	jejunum	April	80	97.6	10.9	15.7	2	2	Negative	Present	diverticular	No growth	11	6	2	ABSENT	Discharged
40	KK	64	6	F	ileum	April	112	101	9.4	25.7	1	2	positive	Present	enteric	E. coli	32	13	6	PARA STOMAL HERNIATION	Discharged
41	RS	37	3	M	ileum	April	102	97.4	9.9	13	1	2	Positive	Present	traumatic	No growth	27	11	15	ABSENT	Discharged
42	HK	65	6	F	ileum	April	88	97	11.1	4.4	2	1	Negative	Present	tubercular	E. coli	38	5	17	RESPIRATORY	Discharged
43	MK	22	2	M	gastric	May	82	98.4	12	18.2	2	2	Negative	Present	traumatic	Not known	31	9	20	ABSENT	Discharged
44	HK	81	7	F	sigmoid	May	74	97.6	9.6	18.5	1	2	Negative	Present	diverticular	Not known	78	20	8	PERISTOMAL SKIN INFECTION	Discharged
45	HS	70	6	M	appendix	May	98	96	13.9	13	3	2	Negative	Present	appendicular	Not known	14	26	12	PARA STOMAL HERNIATION	Expired
46	GK	17	1	M	gastric	May	88	97.4	8.3	9.8	1	1	Negative	Present	traumatic	Acinetobactem baumannii	51	8	6	HYPERPYREXIA	Discharged
47	HK	29	2	F	ileum	May	146	100	10.4	5.5	2	1	Positive	Present	tubercular	Aeromonas Hydrophilia	23	12	12	PERISTOMAL SKIN INFECTION	Discharged
48	KR	30	2	M	duodenum	May	110	96.2	10.6	7.6	2	1	Negative	Present	dudenal ulcer	No growth	34	8	15	ABSENT	Discharged
49	A	25	2	F	ileum	May	108	97	11.1	8.8	2	1	Positive	Present	enteric	E. coli	49	24	6	WOUND INFECTION	Discharged

Sr. No	Initial Name	Age	Age group	Gender	site	Month	Pulse	Temp. in F	hb	TLC	HB GROUP	TLC GROUP	Widal Test	Air Diaph	etiology	Pertonial Fluid C/S	Urea	Admission Operation Interval	Stay in Hospital (Days)	Complications	Outcome
50	TS	65	6	M	duodenum	June	96	97.2	7.2	14	1	2	Negative	Present	dudenal ulcer	No growth	39	6	4	ABSENT	Discharged
51	RS	57	5	M	colon	June	70	98.4	15.1	16	3	2	Negative	Present	nonspecific	No growth	45	9	3	HYPERPYREXIA	Discharged
52	DK	58	5	F	ileum	June	110	96.8	11	8.4	2	1	Positive	Present	enteric	Klebsiellea SP	48	14	10	ABSENT	Discharged
53	DS	65	6	M	ileum	June	108	102	13.6	14	3	2	Positive	Present	enteric	E. coli	83	2	4	UTI	Discharged
54	SK	18	1	F	ileum	July	76	97	9.7	12.3	1	2	positive	Present	enteric	No growth	181	5	10	ABSENT	Discharged
55	SS	78	7	M	ileum	July	100	96.2	13.1	14.5	3	2	Positive	Present	enteric	No growth	53	10	15	PERISTOMAL SKIN INFECTION	Discharged
56	SK	70	6	F	jejunum	July	96	98.1	9.1	16.7	1	2	Negative	Present	mucormycosis	No growth	130	47	5	ABSENT	Expired
57	KS	45	4	M	ileum	July	110	96.8	6.8	9.8	1	1	Positive	Present	enteric	E. coli	74	20	12	ABSENT	Discharged
58	CD	50	4	F	duodenum	July	104	97	11.2	9.4	2	1	Negative	Present	dudenal ulcer	No growth	53	6	16	HYPERPYREXIA	Discharged
59	GS	45	4	M	jejunum	July	86	97.2	9.9	6.8	1	1	Negative	Present	nonspecific	No growth	27	11	10	ABSENT	Discharged
60	SK	72	7	F	duodenum	July	140	97.6	10.7	11.5	2	2	Negative	Present	dudenal ulcer	Klebsiella pneumonia	77	6	8	WOUND INFECTION	Discharged
61	RC	23	2	M	colon	July	92	97.2	7	9	1	1	Negative	Present	nonspecific	Enterobacter cloacae	28	17	6	ABSENT	Discharged
62	HS	24	2	M	duodenum	August	140	96	7.8	14.5	1	2	Negative	Present	dudenal ulcer	No growth	210	6	11	ABSENT	Discharged
63	A	17	1	F	ileum	August	86	97.4	11.2	14	2	2	Positive	Present	enteric	No growth	82	42	9	UTI	Expired
64	KB	50	4	F	sigmoid	August	100	97.2	10.2	9.5	2	1	Negative	Present	malignant	E. coli	11	20	12	ABSENT	Discharged
65	PK	40	3	F	duodenum	August	114	97.6	8.5	6	1	1	Negative	Present	dudenal ulcer	E. coli	28	6	3	ABSENT	Discharged
66	GS	55	5	M	ileum	August	82	97	9.8	7.5	1	1	Positive	Present	enteric	Not known	47	12	6	WOUND INFECTION	Discharged
67	BS	51	5	M	ileum	August	134	101	14.3	9.5	3	1	Positive	Present	enteric	E. coli	64	36	10	ABSENT	Expired
68	RCY	30	2	M	ileum	August	130	97.2	13.1	13.8	3	2	Positive	Present	enteric	E. coli	53	12	12	ABSENT	Discharged
69	TS	65	6	M	ileum	August	74	97	7.4	11.4	1	2	Positive	Present	enteric	E. coli	140	6	7	RESPIRATORY	Discharged
70	HS	26	2	M	ileum	August	76	97.4	6.6	15	1	2	Negative	Present	enteric	E. coli	34	7	9	ABSENT	Discharged
71	PA	51	5	M	ileum	August	86	97	10.3	16.0	2	2	positive	Present	diverticular	E. coli	59	4	20	PERISTOMAL SKIN INFECTION	Discharged
72	AK	27	2	F	jejunum	September	98	96.2	11	18.2	2	2	Negative	Present	nonspecific	No growth	65	14	14	ABSENT	Discharged
73	GS	55	5	M	caecum	September	110	98.1	10.8	19	2	2	Negative	Present	malignant	E. coli	83	8	17	HYPERPYREXIA	Discharged
74	PK	45	4	F	gastric	September	110	96.8	8.3	11.4	1	2	Negative	Present	traumatic	Serratia Fonticela	44	11	6	ABSENT	Discharged
75	N	19	1	F	ileum	September	70	101	8.6	9	1	1	Positive	Present	tubercular	No growth	32	2	5	BURST ABDOMEN	Discharged
76	GS	28	2	M	appendix	September	120	97.2	15.1	22.0	3	2	Negative	Present	appendicular	No growth	36	26	6	RESPIRATORY	Expired
77	BS	45	4	M	appendix	September	120	97.6	13.4	17.4	3	2	Negative	Present	appendicular	No growth	36	4	14	UTI	Discharged
78	SC	60	5	M	ileum	September	110	97.2	10	16.2	2	2	Positive	Present	tubercular	E .coli	48	9	10	ABSENT	Discharged
79	IS	40	3	M	ileum	October	96	96	11.2	11	2	2	Positive	Present	enteric	No growth	36	17	14	ABSENT	Discharged
80	JS	80	7	M	ileum	October	120	97.4	11.2	5.6	2	1	Positive	Present	nonspecific	E. coli	38	13	15	RESPIRATORY	Discharged
81	BS	52	5	M	ileum	October	110	97.2	11.7	8.9	2	1	positive	Present	enteric	E. coli	46	6	10	ABSENT	Discharged
82	DL	60	5	M	gastric	October	76	97.6	11.4	9.5	2	1	Negative	Present	nonspecific	Tri Chosoporan Assahii	46	14	6	WOUND INFECTION	Discharged
83	KL	48	4	M	gastric	October	120	97	11.6	9.6	2	1	Negative	Present	nonspecific	No growth	46	42	8	BURST ABDOMEN	Expired
84	PN	54	5	M	duodenum	October	86	96.8	11.2	10.9	2	2	Negative	Present	dudenal ulcer	No growth	56	12	12	ABSENT	Discharged
85	GS	65	6	M	ileum	December	120	102	15.1	10.5	3	2	Positive	Present	enteric	No growth	37	8	12	RESPIRATORY	Discharged

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Date 9/5/19

The Principal,
DMC, Ludhiana.

Subject: Approval of Plan of Thesis.

This is to inform you that the Faculty of Medical Sciences in its meeting held on 29.05.2019 has approved the plan of thesis of **Amanpreet Singh Alias Suresh Kumar**, a student of your college for **MS General Surgery** along with the names of Supervisor/Co-Supervisor as under:-

Topic Plan of Thesis

A study of spectrum of gastrointestinal perforations

Supervisor
Dr. Varun Gupta
Assoc. Prof.,
Dept. of
Gastroenterology,
DMCH, Ludhiana.

Co-Supervisor
Dr. Chiranjiv Singh Gill
Prof.,
Dept. of Surgery,
DMCH, Ludhiana.

The student has to submit the four copies of thesis (along with PDF format) , to the Controller of Examinations, BFUHS, Faridkot, at least six months before the commencement of theory examination, if he/she is otherwise eligible to take the examination. He /She must directed to attach a photocopy of this letter with the forwarding letter while submitting thesis to the University along with the letter of approval of University for change of supervisor/Co-Supervisor, change of topic,(if any).

SP Singh

Dr. S P Singh MS(Oph)
Controller of Examinations

Note :

1. *If any discrepancy found regarding topic of thesis or Supervisor/Co-Supervisor, inform undersigned within one month after issue of this letter.*
2. *The student may submit the thesis as per the schedule already conveyed i.e for May/June examination 30th Nov of the preceding the year of examination and for Nov/Dec examinations 31st May of the year of examination.*

A STUDY OF SPECTRUM OF GASTROINTESTINAL PERFORATIONS

THESIS PROPOSAL

FOR APPROVAL OF SUBJECT OF THESIS TO BE SUBMITTED IN

PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MASTER OF SURGERY

IN

GENERAL SURGERY

OF THE

BABA FARID UNIVERSITY OF HEALTH SCIENCES

FARIDKOT

OCTOBER, 2018

DR AMANPREET SINGH

DEPARTMENT OF GENERAL SURGERY
DAYANAND MEDICAL COLLEGE AND HOSPITAL
LUDHIANA

ABSTRACT OF PLAN OF THESIS

Title	A STUDY OF SPECTRUM OF GASTROINTESTINAL PERFORATIONS
For the degree of	M.S General Surgery
Name of the candidate	Dr. Amanpreet Singh
Supervisor	Dr. Varun Gupta, Associate Professor, Department of General Surgery, DMCH, Ludhiana
Co-supervisor(s)	Dr. Chiranjiv Singh Gill, Professor, Department of General Surgery, DMCH, Ludhiana
Institution	Dayanand Medical College and Hospital, Ludhiana
University	Baba Farid University of Health Sciences, Faridkot

Introduction: Perforation peritonitis is the most common surgical emergency in India. Despite advances in surgical techniques, antimicrobial therapy and intensive care support, management of peritonitis continues to be highly demanding, difficult and complex. Our study is designed to highlight the spectrum of gastrointestinal perforations as encountered by us at Dayanand Medical College and Hospital, Ludhiana.

Aim of Study: 1) To study the etiology gastrointestinal perforations. 2) To assess the outcome of surgical intervention of gastrointestinal perforations.

Materials & Methods: The prospective study to be conducted in department of Surgery in Dayanand Medical College and Hospital, Ludhiana. The study will include patients with diagnosis of gastro intestinal perforations admitted in surgical units at DMCH.

Clinical Significance: Gastrointestinal perforations accounts for major number of surgical emergencies at tertiary care centres.at the outset of this prospective study spectrum of GI perforations will be studied for its etiological patterns and to access the outcome of surgical interventions of Gastrointestinal perforations with observed mortality and morbidity.

Keywords: Gastrointestinal Perforation, Peritonitis, Exploratory Laparotomy.

(Signature)	(Signature)	(Signature)	(Signature)
Candidate	Co-supervisor	Supervisor	Principal

CERTIFICATE OF FACILITIES AVAILABLE

This is to certify that the facilities for work on the subject of thesis titled **"A STUDY OF SPECTRUM OF GASTROINTESTINAL PERFORATIONS"** exist in the Department of General Surgery, DMC&H, Ludhiana and will be provided to the candidate. We will see that the data being included in the thesis is genuine and is collected by the candidate himself under our supervision and guidance.

Supervisor

Dr. Varun Gupta
Associate Professor
Department of Surgery
DMCH, Ludhiana

Co-Supervisor

Dr. Chiranjiv Singh Gill
Professor
Department of Surgery
DMCH, Ludhiana

Dr. Jaspal Singh
Professor & Head
Department of Surgery
DMCH, Ludhiana

Place : LDH

Date : 11/12/18

APPROVAL PROFORMA
BY
RESEARCH & ETHICAL COMMITTEE
DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA

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Department	General Surgery
Topic of Thesis	A STUDY OF SPECTRUM OF GASTROINTESTINAL PERFORATIONS
Likely date of appearing in PG examination	June 2021
Date of enrollment	10th May, 2018
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1. HOD Pharmacology	1. HOD Physiology
2. HOD Surgery	2. HOD Pathology
3. HOD Pathology	3. HOD Pharmacology
4. HOD Medicine	4. HOD SPM
5. Dean Academics	5. HOD Medicine
6. Vice Principal	6. HOD Surgery
	7. HOD Obst. & Gynae.
	8. Legal Expert
	9. Secretary, IEC
	10. Dean Academics
	11. Vice Principal
	12. Principal

Approved: Yes / No

Chairperson
Research Committee
Chairperson
Research Committee

Approved: Yes / No

Chairperson
Ethics Committee
Chairperson
Ethics Committee

BABA FARID UNIVERSITY OF HEALTH SCIENCES, FARIDKOT

PROFORMA FOR REGISTRATION OF SUBJECT FOR DISSERTATION

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2	NAME OF THE INSTITUTE	DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA.
3	COURSE OF STUDY AND SUBJECT	MS(GENERAL SURGERY)
4	DATE OF ADMISSION OF COURSE	10th MAY 2018
5	TITLE OF THE TOPIC	A STUDY OF SPECTRUM OF GASTROINTESTINAL PERFORATIONS

6 BRIEF RESUME OF THE INTENDED WORK

6.1 NEED FOR THE STUDY

Perforation is the most disastrous complication of peptic ulcer andinspite of modern management it is still life threatening catastrophe (Hugh TB, 1990). Gastrointestinal (GI) tract perforations can occur due to various causes, and most of these perforations are emergency conditions, that require early recognition and timely surgical treatment.[1] The mainstay of treatment for bowel perforation is repair of perforation, surgically, Endoscopic, Laparoscopic and laparoscopic assisted procedures are now being increasingly performed instead of conventional laparotomy.

The gastrointestinal tract consists of the stomach, small intestine, and large bowel. It is possible for a perforation, or hole, to develop in the wall of the gastrointestinal tract. This condition is called gastrointestinal perforation.

Gastrointestinal perforation is a painful condition that can lead to further health complications, so emergency surgery is often necessary.

Perforation of a duodenal ulcer allows egress of gastric and duodenal contents into the peritoneal cavity with a resulting initial chemical peritonitis. If continuing leakage of gastro duodenal contents, bacterial contamination of the peritoneal cavity can occur.[2,3] Peritonitis due to perforation of gastro intestinal hollow viscus is the common surgical emergency in India and the spectrum of disease is different from that found in the western world. The advent of proton pump inhibitors and helicobacter pylori eradications in the management of chronic peptic ulcer disease has reduced the operative treatment of this condition to its complications. But yet perforated duodenal ulcer remains a major life threatening complication of chronic ulcer peptic disease. Despite

advances in surgical techniques, antimicrobial therapy and intensive care support, management of peritonitis continues to be highly demanding, difficult and complex.[3]

Gastrointestinal perforations accounts for major number of surgical emergencies at tertiary care centres.at the outset of this prospective study spectrum of GI perforations will be studied for its etiological patterns. The role of early surgical interventions along with observed mortality and morbidity.

If a person has any of the illnesses that may lead to gastrointestinal perforation, they should follow the treatment plan that their doctor advises. This reduces the risk of developing the condition. As with any condition, the outlook improves with early diagnosis and treatment. The size of the hole and the length of time before treatment may determine how successfully surgeons can repair the perforation. This will, in turn, affect the recovery.

6.2 REVIEW OF LITERATURE

Robertson et al (1958) a case of spontaneous rupture of the cecum following tremendous distention is reported. Neither a lesion involving the cecum nor any other obstructing lesion of the more distal colon could be found. A review of the literature does not reveal similar cases.[1]

Huttunen R et al in 1977, The etiology of nontraumatic small bowel perforations in 24 operated patients was as follows: strangulation in five, diverticulum in four, foreign bodies in four, idiopathic in three, Crogn's disease in two, malignant atrophic papulosis of Degos (MAP) in two, and tuberculosis, carcinoid tumor, radiotherapy, and iatrogenic in one. In favorable circumstances, as in strictly localized lesions with well known etiology and otherwise normal bowel, a simple closure of perforation is warranted. In more far advanced cases operated upon early enough, we still consider bowel resection and primary anastomosis as the best method of treatment, though it yielded poor results in procedures are advisable to protect the anastomosis.[2]

Tan ley siang et al 2007: Gastrointestinal perforation occurs when the wall of the gastro-intestinal tract like stomach, small intestine or large bowel develops a hole through its entire thickness. This retrospective study was aimed to identify pattern of GIT perforations that caused sudden deaths in this part of the world. There were 61 cases of GIT perforation out of 5579 autopsies conducted during a period of ten years (1996-2005). The incidence rate of fatal gastrointestinal perforation was 1.09% during this period. Out of these 61 cases, there were 49 males (80.3%) and 12 female (19.7%). The most common site of gastrointestinal perforation was at the stomach (45.7%), followed by duodenum (18.5%), esophagus (9.9%), small intestine (9.9%),

and large intestine (16.0%). The 36.07% cases had positive correlation with at least one of the known risk factors.[3]

Amir Hossein Sarrami et al 2010, Abdominal tuberculosis (TB) is the sixth commonest extra-pulmonary TB form after lymphatic, genitourinary, bone and joint, miliary and meningeal tuberculosis. Perforation is a serious and uncommon complication of abdominal tuberculosis which can occur even during the treatment.[4]

Robin Kaushik et al 2006, Perforation peritonitis is the most common surgical emergency in India. The spectrum of etiology of perforation in Tropical countries continues to be different from its Western counterpart. The objective of the study was to highlight the spectrum of perforation peritonitis as encountered by us at Government Medical College and Hospital (GMCH), Chandigarh.[5]

Sujit. M. chakma et al 2013: Perforation peritonitis mostly results from the perforation of a diseased viscus. Other causes of perforation include abdominal trauma, ingestion of sharp foreign body and iatrogenic perforation. The diagnosis is mainly based on clinical grounds. Plain abdominal X-rays (erect) may reveal dilated and oedematous intestines with pneumoperitoneum. Ultrasound and CT scan may diagnose up to 72% and 82% of perforation respectively. The present study was carried out to study various etiological factors, modes of clinical presentation, morbidity and mortality patterns of perforation peritonitis presented in the RIMS hospital, Imphal, India.[6]

Kin tong chung et al 2017: Peptic ulcer disease (PUD) affects 4 million people worldwide annually. The incidence of PUD has been estimated at around

1.5% to 3%. The lifetime prevalence of perforation in patients with PUD is about 5%. PPU carries a mortality ranging from 1.3% to 20%. Thirty-day mortality rate reaching 20% and 90-d mortality rate of up to 30% have been reported. With the advancement of medical technology, PUD can now be treated with medications instead of elective surgery. The classic triad of sudden onset of abdominal pain, tachycardia and abdominal rigidity is the hallmark of PPU. Erect chest radiograph may miss 15% of cases with air under the diaphragm in patients with bowel perforation. Early diagnosis, prompt resuscitation and urgent surgical intervention are essential to improve outcomes. Exploratory laparotomy and omental patch repair remains the gold standard. Laparoscopic surgery should be considered when expertise is available. Gastrectomy is recommended in patients with large or malignant ulcer.[7]

Rami bayaa et al 2014: Crohn's disease an idiopathic, chronic inflammatory process that usually affects the ileum and the colon, but can occur anywhere along the digestive tract, from the mouth to the anus. It is challenging to diagnose the condition clinically as it may mimic an acute abdomen secondary to other common causes such as perforated appendicitis. We present a course of the disease in 27 year old Caucasian female with a past medical history of Crohn's disease who presented with severe, generalized abdominal pain and tenderness as well as abdominal rigidity from a subsequent generalized peritonitis. Emergency gastric perforation repair with Graham patch was performed. We will try to answer to the following questions: How common is a perforation in Crohn's disease, and where is the perforation? causes? The complications of a gastric perforation? Can they be

prevented, and what are the chances of them recurring? Are medications risk factor for developing gastric perforation?[8]

T kemparaj et al 2017: Gastrointestinal perforations are one of the most common surgical emergencies. Duodenal perforations are most common. Ileal perforations secondary to enteric fever (typhoid) have highest morbidity and mortality. Most of the anastomotic leaks can be treated conservatively. Mortality depends on the general condition of the patient and associated pre-operative comorbidities.[9]

J clin et al 2003: Malignant complications occur in celiac disease and dermatitis herpetiformis, particularly small bowel lymphoma. Although intestinal ulceration, especially in jejunum or ileum is rare, spontaneous free perforation of the intestine developed in 6 patients with established or suspected celiac disease and dermatitis herpetiformis due to a malignant lymphoma. In 3 cases, perforation developed after celiac disease was diagnosed and compliance with a gluten-free diet was strictly maintained and repeatedly evaluated. In all patients, the lymphoma involved the jejunum, but in 1 of these, perforation was defined in the colon indicating that any intestinal site may suffer free perforation from lymphoma in celiac disease. This report documents a high mortality for this serious complication in celiac disease, its lack of predictability and the potential for development even with strict compliance to a gluten-free diet.[10]

Dunne Ja et al 2011: A patient of Pakistani-origin was admitted to Bradford Royal Infirmary, UK, following a 3-week history of cough, headache and general malaise. He had recently spent 10 weeks in Pakistan and on return had been diagnosed in the community with Swine flu. He developed

abdominal pain and diarrhoea in the week prior to admission, and presented to hospital with fever, tachycardia and raised inflammatory markers. He deteriorated rapidly, developing signs of peritonism and Salmonella paratyphi A was grown from blood cultures. CT demonstrated a small volume of free fluid within the abdomen and the patient underwent laparotomy. A small bowel perforation was resected and a side to side anastomosis fashioned. Treatment with intravenous antibiotics was completed and the patient was discharged 9 days postoperatively.[11]

Nicolodi G C et al 2016: In cases of foreign body ingestion, intestinal perforation is more common when the foreign body is elongated and sharp. A computed tomography scan can detect foreign bodies, locate perforations, and guide treatment. The findings that suggest perforation are thickening of the intestinal walls, increased mesenteric fat density, and, less frequently, gas in the peritoneal cavity, often restricted to the point of perforation.[12]

Hazmi A A et al 2015: Acute severe ulcerative colitis is a potentially life-threatening condition that requires a pro-active approach with either effective medical treatment or timely colectomy. This report describes a 39 -year- old female with known ulcerative colitis on maintenance medical therapy. She was admitted for peritonitis, and intraoperative findings revealed a synchronous colonic perforation. After multidisciplinary discussion she was managed with total colectomy and end ileostomy.[13]

Tanwar R et al 2013: Amoebiasis is a common infection in the tropical areas, which commonly presents to the physician as colitis or liver abscess. Invasive amoebiasis is associated with high morbidity, and its presentation in the form of cecal perforation following fulminant colitis with appendicitis and a ruptured

liver abscess is an extremely rare entity. Their concomitant presentation is an indicator towards invasive amoebiasis and is associated with a dismal outcome despite aggressive management.[14]

Roviello R et al 2006: Perforation usually occurs in advanced stages of gastric cancer; nevertheless surgeons should not be always discouraged from a radical treatment of perforated gastric cancer, since perforation even occurs in early stages and seems not to be a negative prognostic factor itself. When possible, emergency gastrectomy should be performed, leaving repair surgery for unresectable tumors. A two-stage treatment is a good treatment option for frail patients with resectable tumors.[15]

Hecker A et al 2015: Despite its relevance literature on the time dependency of early surgical intervention in intestinal perforation is rare and contradictory. In this pilot study there is a tendency that immediate surgical intervention might be of advantage for septic emergency patients.[16]

Sharma A et al 2013: Intestine perforation is one of the most dreaded and common complication of typhoid fever remarkably so in developing world; it usually leads to diffuse peritonitis, requiring early surgical intervention. Despite various measures such as safe drinking water supply and safe disposal of waste, intestinal perforation from salmonellosis remains the most common emergency surgery performed. The incidence continues to rise, so also the mortality, despite new antibiotics and improvement in surgical technique. We hereby present a case report of 35-year-old male with multiple (24) intestinal perforation in the Ileum and Cecum.[17]

Polter D E et al 2015: Colonoscopy is an important procedure in preventing colon cancer. The risk of colonic perforation during colonoscopy at the Baylor

University Medical Center (BUMC) Gastrointestinal Laboratory was chosen as a surrogate marker for the safety of colonoscopy. A recent 2-year experience at BUMC was examined and compared with reports in the medical literature. It was concluded that colonoscopy at BUMC is as safe as that reported by comparable health care systems. The risk of perforation at BUMC was 0.57 per 1000 procedures or 1 in 1750 colonoscopies. Continued efforts to make colonoscopy safer are needed.[18]

6.3 AIMS AND OBJECTIVES OF THE STUDY

1) To study the etiology of gastrointestinal perforations

2) To assess the outcome of surgical intervention of gastro-intestinal perforations.

7. MATERIALS AND METHODS

This is a prospective study for the period of 1 year study (1st Nov 2018 to 31st Oct 2019) and after that 3 month follow-up will be conducted in department of surgery in Dayanand Medical College and Hospital Ludhiana. The study will include patients with diagnosis of gastro intestinal perforations admitted in surgical units at DMCH.

7.1 SOURCE OF DATA

All patients with diagnosis of gastro intestinal perforations admitted at DMCH.

7.2 METHOD OF COLLECTION OF DATA

INCLUSION CRITERIA

- Age > 18 years
- Any duration of peritonitis

Operative Technique

-Time from admission to operation.

-Site of perforation and type of surgery

-Biopsy will be taken from margin of perforation for knowing the etiology.

-Post operatively patients will be followed for any complication for 3 month period.

STATISTICAL ANALYSIS:

Data will be described in terms of range; mean ±standard deviation (± SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. All statistical calculations will be done using SPSS (Statistical Package for the Social Science) SPSS 21 version statistical program for Microsoft Windows.

7.3 DOES THE STUDY REQUIRE ANY INVESTIGATIONS OR INTERVENTIONS TO BE CONDUCTED ON PATIENTS OR OTHER HUMANS OR ANIMALS? IF SO, PLEASE DESCRIBE BRIEFLY.

No special investigations are needed for the conduct of the study.

7.4 HAS ETHICAL CLEARENCE BEEN OBTAINED FROM YOUR INSTITUTION IN CASE OF 7.3?

Yes, attached herewith.

8. LIST OF REFERENCES

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7. Chung KT, Shelat VG. Perforated peptic ulcer - an update. World Journal of Gastrointestinal Surgery. 2017;9(1):1-12.
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9. Kemparaj T, Narasimhaiah NK. Our experience in gastrointestinal perforations: a retrospective study. Int Surg J. 2017;4(2):593-7.
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15. Roviello F, Rossi S, Marrelli D, De Manzoni G, Pedrazzani C, Morgagni P, et al. Perforated gastric carcinoma: a report of 10 cases and review of the literature. World Journal of Surgical Oncology. 2006;4:19.
16. Hecker A, Schneck E, Röhrig R, Roller F, Hecker B, Holler J, et al. The impact of early surgical intervention in free intestinal perforation: a time-to-intervention pilot study. World J Emerg Surg. 2015;10:54.

17. Sharma A, Sharma R, Sharma S, Sharma A, Soni D. Typhoid Intestinal Perforation: 24 Perforations in One Patient. Annals of Medical and Health Sciences Research. 2013;3:S41-3.

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PROFORMA

SERIAL NO. CASE: C.R. NO.:

NAME: SEX:

AGE:

ADDRESS:

DATE OF ADMISSION:

DATE OF OPERATION:

DATE OF DISCHARGE:

COMPLETE CLINICAL HISTORY:

(A) PRESENT HISTORY:

(B) PAST HISTORY:

(C) PERSONAL HISTORY:

SMOKING:

ALCOHOLISM:

FOOD HABITS:

SPICES:

CHILLIES:

MILK:

VEGETARIAN/NON- VEGETARIAN:

HOME MADE/DHABA/ HOTEL ETC:

Signature of Candidate **Signature of Supervisor**

COMPLETE PHYSICAL EXAMINATION:

GENERAL CONDITION:

PULSE RATE: TEMPERATURE:

BLOOD PRESSURE: RESPIRATORY RATE:

ANEMIA: CLUBBING:

CYANOSIS: OEDEMA FEET:

JAUNDICE: LYMPHADENOPATHY:

CHEST EXAMINATION:

C.V.S. EXAMINATION:

PRE-ABDOMEN EXAMINATION:

- ABDOMINAL DISTENSION
- RIGIDITY/ GUARDING
- ABSENT LIVER DULLNESS
- ABSENT BOWEL SOUNDS
- FREE FLUID IN THE PERITONEUM
- PERITONEAL TAPPING

PROVISIONAL DIAGNOSIS:

ROUTINE INVESTIGATION:

HB:	PT/INR:	TLC:	DLC:
PLATELETS:	HEMATOCRIT:		
B.UREA:	SR.CREAT:	B.SUGAR:	S.ELECTROLYTES
T.BILIRUBIN:	D.BILIRUBIN:	URINE ROUTINE	

Signature of Candidate **Signature of Supervisor**

SPECIAL INVESTIGATIONS

- CHEST X RAY (P/A view)
- PLAIN X-RAY OF ABDOMEN IN ERECT POSTURE
- WIDAL TEST

OTHER INVESTIGATIONS:

- USG ABDOMEN:

- CE CT ABDOMEN

DURATION BETWEEN ADMISSION OF PATIENT AND OPERATION:

OPERATIVE FINDINGS:

POST-OPERATIVE TREATMENT:

BIOPSY REPORT:

PERITONEAL FLUID CULTURE & SENSITIVITY REPORT:

POST- OPERATIVE COMPLICATIONS:

Signature of Candidate **Signature of Supervisor**

Follow up: -

Wound infections

Respiratory complications

Burst abdomen

Parastomal herniation

Hyperpyrexi

UTI

Peristomal skin irritation/infection

Stomal retraction/Prolapse

1st Month

3rd Month

Signature of Candidate

Signature of Supervisor

INFORMED PATIENT CONSENT

Date: _____

I.....D/o, W/o,

S/o..... .....am willing to participate in the study **"A STUDY OF SPECTRUM OF GASTROINTESTINAL PERFORATIONS"** The procedure with its complications has been explained to me in local vernacular language. I have fully understood that no special tests and extra expenditure in any form, merely for the purpose of thesis is being carried out. I am free to opt out the study any time without assigning any reason.

.....
Signature of the Witness

Name:

.....
Signature of the patient

Signature of Supervisor

Signature of Candidate

मरीज अनुमति फार्म

तिथि _____

मैं _____ पत्नी/पुत्र/पुत्री _____

निवासी _____

इस शोधकार्य **"A STUDY OF SPECTRUM OF GASTROINTESTINAL PERFORATIONS"** में भाग लेने के लिए सहमत हूँ। मैं इस शोधकार्य में भाग लेने के लिए अपनी स्वेच्छा से तैयार हूँ। मैं पुष्टि करता/करती हूँ की यह स्वीकृति देने के लिए मुझे कोई आर्थिक प्रलोभन नहीं दिया गया और न ही दबाव डाला गया है। मुझे इस शोधकार्य का उद्देश्य स्पष्ट कर दिया गया है और मुझे यह विश्वास है की यह विज्ञान और मानवता के लाभ के लिए है। मुझे इस शोधकार्य में होने वाले जोखिम के बारे में समझा दिया गया है और मेरी समझ में यह जोखिम बहुत मामुली है।

मैं इस शोधकार्य में भाग लेने के सम्बन्ध में किसी भी समय अपनी अस्वीकृति व्यक्त कर सकता/सकती हूँ और मेरे अस्वीकृति व्यक्त करने का मेरे इलाज पर कोई प्रभाव नहीं पड़ेगा।

_____

गवाह के हस्ताक्षर

नाम:

_____

रोगी के हस्ताक्षर/अंगूठे का निशान

नाम:

_____

अन्वेषक के हस्ताक्षर

_____

विद्यार्थी के हस्ताक्षर

ਮਰੀਜ਼ ਰਜ਼ਾਮੰਦੀ ਫਾਰਮ

ਮਿਤੀ_____

ਮੈ_____ਪਤਨੀ/ਪੁੱਤਰ/ਪੁੱਤਰੀ_____

ਵਾਸੀ _____

"A STUDY OF SPECTRUM OF GASTROINTESTINAL PERFORATIONS" ਤੇ ਚਲ ਰਹੀ ਖੋਜ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਰਜ਼ਾਮੰਦ ਹਾਂ। ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਮੈ ਆਪਣੀ ਮਰਜ਼ੀ ਨਾਲ ਤਿਆਰ ਹਾਂ। ਮੈ ਇਹ ਦਸਣਾ ਚਾਹੁੰਦਾ ਹਾਂ/ ਚਾਹੁੰਦੀ ਹਾਂ ਕੇ ਇਹ ਰਜ਼ਾਮੰਦੀ ਦੇਣ ਵਾਸਤੇ ਮੈਨੂ ਕਿਸੇ ਵੀ ਤਰਾਂ ਦਾ ਲੋਭ-ਲਾਲਚ ਨਹੀ ਦਿੱਤਾ ਗਿਆ ਅਤੇ ਨਾ ਹੀ ਕੋਈ ਦਬਾ ਪਾਇਆ ਗਿਆ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਦਾ ਮਨੋਰਥ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਭਰੋਸਾ ਦਵਾਇਆ ਗਿਆ ਹੈ ਕੇ ਇਹ ਖੋਜ ਵਿਗਿਆਨ ਅਤੇ ਮਾਨਵਤਾ ਦੀ ਭਲਾਈ ਲਈ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਵਿਚ ਹੋਣ ਵਾਲੇ ਖਤਰੇ ਬਾਰੇ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਯਕੀਨ ਹੈ ਕੇ ਇਹ ਖਤਰਾ ਬਹੁਤ ਮਾਮੂਲੀ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਦਾ ਢੰਗ – ਤਰੀਕਾ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ।

ਮੈ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਬਾਰੇ ਆਪਣੀ ਰਜ਼ਾਮੰਦੀ ਕਿਸੇ ਵੀ ਸਮੇ ਵਾਪਸ ਲੈ ਸਕਦਾ ਹਾਂ/ ਸਕਦੀ ਹਾਂ ਅਤੇ ਮੇਰੀ ਰਜ਼ਾਮੰਦੀ ਵਾਪਸ ਲੈਣ ਦਾ ਮੇਰੇ ਇਲਾਜ ਤੇ ਕੋਈ ਅਸਰ ਨਹੀ ਹੋਵੇਗਾ।

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ਗਵਾਹ ਦੇ ਹਸਤਾਖਰ

_____
ਮਰੀਜ਼ ਦੇ ਹਸਤਾਖਰ

ਮਿਤੀ_____

ਮਿਤੀ_____

ਪਤਾ _____

ਪਤਾ _____

_____
ਨਿਰੀਖਕ ਦੇ ਹਸਤਾਖਰ

_____
ਸਿਖਿਆਰਥੀ ਦੇ ਹਸਤਾਖਰ